FIFTY-EIGHTH YEAR 1916

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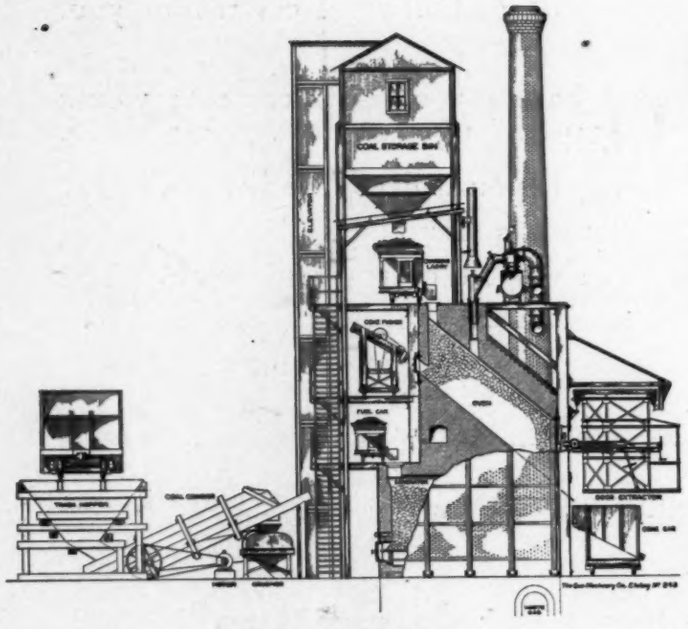

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AMERICAN

GAS LIGHT JOURNAL

VOL. CV., No. 25. NEW YORK, DECEMBER 18, 1916 WHOLE No. 3,067.

HEAT FURNACE AND BAND FOR USE IN PRESSING HEATED COPPER BANDS ON SHELL ENDS

Rapidity, Heat Control, Safety from Fire Risk, and Elimination of Necessity of Fuel Storage Space Factors that Determined Selection of Gas Furnaces in Chattanooga Iron Works

New Installation Made on Permanent Basis—Management of Plant Expects to Utilize Equipment for Other Purposes when Shell Contracts are Completed—Present Gas Consumption 1,000,000 Cu. Ft. Per Month—Chattanooga Gas Company Expects 3-In. Main into Plant will Eventually be Utilized to Maximum Capacity

Rapidity of operation, control of heat, safety from fire risk, the advantage of always having the fuel ready and available when wanted and no loss of space for the storage of fuels were the factors that determined the selection of gas furnaces over all other types in the additions to the plant of the Columbian Iron Works and secured for the Chattanooga Gas Company, a 1,000,000-cu. ft.-per-month customer.

When the Columbian Iron Works, of Chattanooga, Tenn., solicited the agents of European governments to manufacture for them munitions of war, it had in mind that such manufacture in its existing plant time could not expect to produce such munitions in any appreciable quantity, but H. M. Loftin, President and Manager of the company, a man of wide mechanical and business experience, was quite convinced that he could successively compete with the leading munition manufacturers with special machinery and a new plant. Mr. Loftin felt that the extension to his plant had a future even though the European war should end before his company made a single shell, provided he could secure a good sized order to begin with; the fulfillment of which was guaranteed.

COMPANY ALSO MANUFACTURES WATERWORKS APPURTENANCES

The Columbian Iron Works, besides manufacturing shells for the British government, manufactures fire hydrants, and a very large variety of valves and other material. It employs between

300 and 400 men, and at present its plant is kept running night and day. At the present time, the plant is manufacturing a variety of shells known as the "high explosive type," these shells when loaded and ready for use have a weight of approximately 100 lb. each; empty they weigh 85 lb. and 3 oz. They are turned out of solid steel ingots.

The plant has a capacity of 300 shells per day, and has in the last few months produced 34,000 shells.

On the first contract secured, there remains 1,000 shells yet to be produced; on a new contract only recently made, the company will manufacture 40,000 shells.

This contract amounts to practically $1,000,000 and therefore gives some idea of the magnitude of this business.

Practically forty operations are required to complete each shell. The material is taken from the stock, and delivered to a Gorton cutting-off machine, which is capable of cutting through 6 in. of steel in three minutes.

From this point the shells are delivered to a centering machine, and then to a ruff turning lath, and back to the Gorton cutting machine for final cut.

They are rough bored, then cone bored, and again bored on a finishing machine. Then they are center-reamed, and, finally the finishing touches are put on the outside.

The ends are faced for plate and bushings, and are turned over for preliminary inspection to the company's inspectors. All faulty shells are turned back to the departments.

The work then continues, the end or nose of the shell receives a bushing, the serial numbers have to be stamped on and the

INTERIOR OF MACHINE ROOM

shell has to be weighed. The weighing machine is extremely accurate. It not only gives the weight of the shell, but if it is in excess weight it shows to a fraction of an inch the amount that is to be turned off. If the shell is of light weight, it is condemned and thrown out and is known as a "dead shell." A machine for cutting off excess weight is extremely important.

The shell then goes to the drill press for recessing, and receives a base or bottom plate previous to which it must go to an internal milling machine to receive the threads for such base plate. After it has been fitted with a band groove on a special machine, it must be washed to receive a copper band. These bands are about 2 in. in width, and slightly over 6 in. in diameter. They have been previously annealed in a gas furnace with a capacity of 800 bands per day. At present a No. 2 Stewart oven furnace is being used for this purpose. The shells must again be washed in order that all of the oil be cleaned from them. They must also be assembled and the base plate must be riveted on.

Up to this point it has gone through 28 operations. It is now ready for interior varnishing, that is, the inside of the shell which is to receive the explosive must be coated with copal varnish.

Varnish Baked on in Gas Oven

A special machine so arranged as to varnish 36 shells at a time has been provided for this work. From the varnish machine the shells are taken to the gas oven for baking.

This oven has been furnished by the Oven Equipment and Manufacturing Company, of New Haven, Conn., and is a Crawford furnace. It has a capacity of 144 shells, and is capable of receiving 288 shells.

Three hours are required to bake the copal varnish on the inside of the shell. This varnish serves the purpose of preventing the explosive from coming in contact with the metal.

A special unloading device is provided for taking the shells from the oven. The ends must be faced off, the copper band which is now crude in shape must be turned off, and finally the company and the British government must inspect them before they go to the bond room to become the property of the British government.

Each operation is very important as a shell of this kind must be exactly right, so in the production of the most expensive shells, gas plays a very important part.

When the plans for the plant were considered, gas furnaces were selected over all other furnaces for the following reasons: Rapidity of operation, control of heat, safety from fire risks, the fuel was always there when the furnace was needed, no loss of space in storage of fuels. A 3-in. gas main enters the plant of the Columbian Iron Works, and it is the expectation of the gas company that this main may eventually be used to its maximum capacity.

The use of gas does not end with the manufacture of shells, for Mr. Loftin had in mind the comfort of his men. He knew a warm bath after work was appreciated, and so he installed a Pittsburgh automatic water heater to complete the requisites of the locker room.

In the tool room all high speed steel is tempered on a "Stewart High Speed Steel tempering furnace." No risks can be taken with oil or coke furnaces when high speed steel is $3.00 a pound, hence the use and realization of the true value of gas fuel.

Carbon steel is tempered on an American Gas Air tempering furnace, and, besides this, a cyanide furnace occupies an important place in the very large tool room. This furnace is used for hardening cutters, dies, springs, etc., and is very satisfactory.

In the assembling valve room, a Babbitt melter takes care of the metal of which a very large quantity enters into the manufacture of gate valves, fire hydrants, etc. Altogether gas is "The Fuel" at the Columbian Iron Works, and when S. E. DeFrese, the general manager of the Chattanooga Gas Company, asks Mr. Loftin how they "are getting along" he usually answers, "I'm satisfied." By special permission the illustrations in this article have been loaned the Chattanooga Gas Company by the Columbian Iron Works.

SECTIONAL OVEN FOR BAKING COPAL VARNISH ON INTERIOR OF SHELLS

STOCK ROOM OF COLUMBIAN IRON WORKS SHOWING SHELLS AND COPPER BANDS WHICH ARE ANNEALED BY GAS

Crisis in Gas Industry Threatens Unless Prompt Action is Taken Towards Establishing Heat Unit Standards which will Permit Wider Choice of Raw Materials

W. R. Addicks Foresees, Unless Proper Measures are Adopted to Avert It, Situation Similar to that in 1891 When Naphtha Was Withdrawn from Purchasing Power of Gas Companies—Current Price Shows Increase of 66 Per Cent

From a gas manufacturer's point of view the supply of oil for gas manufacturing purposes in the years to come is a matter that to-day needs serious consideration, asserted W. R. Addicks, first vice-president of the Consolidated Gas Company of New York, in a paper presented before the Guild of Gas Managers at Boston, Dec. 9.

The important question is not whether there is oil in the market but whether there is oil in the market at a price that the gas manufacturer can afford to pay for it and still sell the gas product at a price which is governed, not by elements of cost or supply and demand, but by an edict of a legally constituted body such as the Gas or Public Service Commission.

Undoubtedly there is a great deal more naphtha or gasolene in the market to-day than there was in 1891, but gas companies though universally using naphtha or gasolene at that time could not afford to use it to-day. On March 6, 1913, the Joint Committee on Calorimetry of the Public Service Commission and Gas Corporations in the Second Public Service District, New York State, said in their report on page 8, paragraph 8:

> "Inventors of oil engines are perfecting their devices rapidly, which results in much more extended direct use of oil for power generation. Oil used in this way commands a higher price than when used for gas enrichment. The United States and other governments are resorting to increased use of oil fuel for war vessels, and their needs are so paramount that price is not a critical factor. (Reference: 'The Production of Petroleum in 1911,' U. S. Geological Survey, 1912)."

On April 18, 1916, the Director of the U. S. Bureau of Mines, Mr. Manning, says that

> "with a rate of production the same as in 1915 the crude oil supply of the United States, from which we are getting our present supply of gasolene, will be exhausted in twenty-seven years.
>
> "* * * and we are using another 20 per cent of our crude petroleum inefficiently in competition with coal as in the manufacture of artificial gas. Three-fourths of the entire amount of artificial gas in this country is made from petroleum. * * * It is needless to say that petroleum should not be used for this purpose.
>
> "The solution of the problem is conservation—our petroleum resources being put to their proper uses. Let us stop this wasteful foolishness * * * the use of crude oil in making of artificial gas. * * *. One student of the oil situation says that through the wasteful use of the petroleum resources the United States is now confronted with a national crisis of the first magnitude and he may not be far wrong."

On Nov. 9, 1916, in a paper read before the Third Annual Joint Meeting of the New York Sections of the Illuminating Engineering Society and the American Electrochemical Society, entitled "Some Notes on Gas Standards" —abstracted in AMERICAN GAS LIGHT JOURNAL, page 335, issue of Nov. 20—I pointed out the result of the utilization of gasolene by automobile as follows:

> "The introduction of the automobile in 1891, where an internal combustion engine used gasolene for power, revolutionized the water-gas industry. All water-gas plants habitually used gasolene and naphtha for enriching. These were entirely withdrawn from the market for this purpose,

resulting in the abandonment of some gas-plants that prior to this time were justly celebrated for the gas product produced. Fortunately, the Lowe type of water-gas apparatus successfully utilized a lower gravity petroleum, later known as gas oil, and this branch of the industry survived the crisis. Contemplation of this condition impels me to remark that this generation is using for its pleasures the necessities of future generations; it is to be hoped that the future generations may offset this serious condition by new inventions that will neutralize our prodigality."

The Assistant Secretary of the Navy, Hon. F. D. Roosevelt, in an address delivered before the American Mining Congress in Chicago on Nov. 16, 1916, entitled "The National Need of Naval Petroleum Reserves," makes the following statements:

"It may be set down as a definite conclusion that the Navy cannot revert to coal-burning vessels without enormous loss of efficiency, and, furthermore, that the Navy will not so revert.

"For our present needs we should have probably 2,000,000 barrels" (100,000,000 gal.), "so stored. Ten years hence we ought to have 20,000,000 barrels." (1,000,000,000 gal.)

"We must admit that the total amount of oil within our continental limits is growing less from year to year and the number of available sources of new supply is necessarily diminishing. We already know the general figures in regard, for instance, to the Appalachian oil field, and we know also that the peak of supply has been, or will soon be reached in other fields, and that there is not much probability of discovering new fields of the same magnitude as those already opened. Add to this the known fact that commercial consumption of oil is increasing and one must reach the inevitable conclusion that there must be soon either importations from foreign fields or a serious shortage in this country. Oil men are much inclined to ridicule the idea that there can ever be a shortage of oil for naval purposes. They base this perhaps on a lack of knowledge of what our future needs are to be, and the following figures may be perhaps a surprise to people who have not gone into this question from the point of view of the future. The Navy burns to-day in time of peace about 842,000 barrels of oil" (42,100,000 gal.). "The construction of new ships during the next few years, *already authorized by Congress*, will call for approximately the following annual consumption.

"Fiscal year 1917, 1,475,000 barrels" (73,750,000 gal.)
" " " 1918, 1,942,000 barrels" (97,100,000 gal.)
" " " 1919, 2,845,000 barrels" (142,250,000 gal.)
" " " 1920, 4,175,000 barrels" (208,750,000 gal.)
" " " 1921, 5,854,000 barrels" (292,700,000 gal.)
" " " 1922, 6,574,000 barrels" (328,700,000 gal.)
" " " 1923, 6,721,000 barrels" (336,050,000 gal.)

"Further, if the General Board recommendations for the replacement of battleships after they have been in service twenty years is carried out by Congress, the total consumption of oil in the fiscal year 1927, or ten years hence, will reach the enormous total of 10,237,000 barrels!" (511,850,000 gal.). "You will not blame me if I wonder whether the engineers of this country have carefully weighed the naval needs for the next ten years in the light of these startling figures."

As compared with the foregoing "startling figures" of the oil requirements of the Government, it is interesting to note that the Consolidated Gas Company of New York, the largest gas company in this country, will probably use for the year 1917 but 112,000,000 gal. of oil. It is believed that even this quantity of oil is difficult for the oil companies to supply and this fact is reflected in an increase of price amounting to 66 per cent over the price current. I am convinced that the oil the gas companies require could be sold at a material advance for other purposes over the prices charged to them. I am impressed with the fact that the oil companies are no longer dependent upon the gas companies to use up their heavy oil, as oil suitable to gas enriching purposes is equally suitable for power and fuel purposes.

I am convinced that if something is not done promptly toward establishing a standard for gas that will depend upon heat units and not upon candlepower and permit a larger choice of raw materials that the gas industry will face a crisis of greater and more far reaching effect than in 1891, for then, when naphtha was withdrawn from the purchasing power of the gas company, there still remained available an oil product that was within the ability of the gas companies to pay for and still sell their gas product at established and legal rates.

American Dyes Getting in to the Foreign Market

American dyes are making their way, abroad as well as at home. They are now going to foreign countries to a value of seven million dollars a year; before the war they did not amount to more than $400,000 a year. Of course, prices have risen tremendously. In the imports of synthetic indigo, in 1904 the average value declared by importers was 14 cents a pound; this year it has been $1.70.

Injurious Effects of Impurities in Boiler Feed Water

W. H. Fulweiler Enumerates Usual Impurities Present and Discusses Their Effects on Boilers—Analysis of Various Feed Waters Given

In gas works practice, water has three general uses: to raise steam in the boilers; as a cooling agent in the condensers; and as a seal in the wash box, the hydraulic main and holders.

In the wash box, hydraulic main, and holders, the water does not come in contact with heated surfaces, therefore, there would be no reason to use specially purified water for this purpose except should the water be highly corrosive.

In the condensers, the temperatures involved are relatively low, and there is a very rapid flow of water, so that any precipitate is generally soft and the greater bulk is carried away. Occasionally with very hard waters and when condensing facilities are limited it might be worth while considering whether it would not prove economical to roughly purify condenser water.

It is in the boiler, however, asserted W. H. Fulweiler, of the Department of Tests of the United Gas Improvement Company, in his paper on the "Purification of Water for Gas-Making Purposes," presented at the annual meeting of the American Gas Institute, that our important problem arises. Here we have an entirely different set of conditions. The temperature of the metal surfaces is very much higher, and due to the pressure, the water attains a very high temperature. Furthermore, the water, instead of continually passing on as in the condenser, is evaporated, leaving behind in the boiler its mineral constituents, whose concentration increases at a very rapid rate. Since we are burning a relatively expensive fuel, it is necessary that the rate of heat transfer between the metal and the water should be as high as possible, both to secure economy and to insure safety.

Impurities in Boiler Water

Without going into the reactions involved, we may say that the usual impurities in boiler feed water are the salts of calcium, magnesium, iron and aluminum, sodium and potassium; the acid radicals are bicarbonate, carbonate, sulphate, chloride, and occasionally nitrate; silica, clay, and organic matter generally in suspension; possibly free mineral acids, hydrogen sulphide and carbon dioxide.

In the analysis of boiler waters, we actually determine bases, such as calcium, magnesium, iron, etc., and the acid radicals, sulphate, carbonate and chloride as such, and an accurate statement of the combination of bases and radicals is extremely difficult, if not impossible. There are a number of rules for combining the radicals, but they are at best arbitrary and empirical. It would seem that the safest method of expression is that known as the ionic form, which states that there exists in the water so many parts per million of calcium, magnesium, iron, etc., and of the different acid radicals. Such a system is in accordance with the facts, while the combinations may or may not be correct. The older method, however, is more convenient and probably sufficiently accurate for the comparison of different sources.

An accompanying table gives the analysis of a number of waters used for boiler feed purposes.

Reactions in the Boiler.

When water containing these compounds is heated in the boiler to a high temperature and pressure, and in the presence of metallic iron (which seems to accelerate some of the reactions) certain changes take place. The bicarbonates that are formed and dissolved in the water by the presence of carbonic acid are broken up, CO_2 is driven off, and the bases are precipitated, as the carbonate in the case of calcium; hydrate in the case of magnesium, and oxide in the case of iron. The magnesium chloride is decomposed and precipitated as carbonate or hydrate. Nitrates are broken up and precipitated as oxides. Organic matter is usually decomposed, forming acid compounds. Free mineral acids, if present in excess, become very active. The acid radicals of magnesium, aluminum, and iron will be set free, and under certain conditions (lack of alkaline carbonates) may attack the boiler. Apparently the chlorine ion becomes very corrosive at certain concentrations, and in the presence of metallic iron.

ANALYSES OF BOILER FEED WATERS.
Unit—Parts per Million.

	A	B	C	D	E	F	G	H	I
Total solids	33	78	121	175	243	385	548	705	1,035
Iron oxide and alumina	1.1	4.4	1.7	3.0	7.5	3.4	3.4	2.4	6.0
Calcium bicarbonate	—	25.5	71.5	90.5	137.3	168.0	259.5	255.2	3.0
Calcium sulphate	5.1	10.5	14.3	—	20.4	—	—	250.0	11.7
Calcium chloride	7.1	—	—	—	—	—	—	—	—
Magnesium bicarbonate	—	14.3	19.9	42.0	63.2	50.6	93.2	82.9	3.8
Magnesium sulphate	—	—	—	10.3	—	45.6	—	23.5	—
Magnesium chloride	2.2	—	—	—	—	—	—	—	—
Sodium bicarbonate	—	—	—	—	—	—	—	—	705.5
Sodium sulphate	—	0.7	—	—	—	—	24.0	—	—
Sodium chloride	14.2	10.2	2.8	22.9	1.3	60.0	29.2	37.3	184.2
Organic and volatile	0.3	3.0	8.6	0.2	—	—	83.8	23.5	0.3
Silica	3.0	8.1	2.1	3.0	13.5	11.2	22.9	24.3	38.5

A = Concord, N. H., Lake water.
B = Wayne, Pa., Spring water.
C = Syracuse, N. Y., Lake water.
D = Allentown, Pa., River water.
E = Plymouth, Ind., Well water.
F = St. Augustine, Fla., Well water.
G = Des Moines, Ia., River water.
H = Sioux City, Ia., Well water.
I = Charleston, S. C., Well water.

The above changes are generally those due directly to chemical reactions. As concentration increases, due to evaporation of the water, certain salts which are sparingly soluble reach the limit of their solubility and are precipitated, such as calcium and magnesium salts. These are the salts that are generally known as incrustants, and when precipitated under certain conditions, form a hard scale on the metallic surfaces with which they come in contact. In the case of the alkali salts, *i. e.*, the potassium and sodium, their solubility is very great, and their concentration may arise to such an extent that together with other soluble salts they begin to affect the surface tension of the water, which has now become really a concentrated, and in some cases a saturated, solution of chemical compounds.

The following table gives the solubility of a number of the constituents:

SOLUBILITIES OF BOILER WATER CONSTITUENTS

Salt	Parts per million cold	Parts per million hot
Calcium sulphate	2,330	2,170
Calcium bicarbonate	385	——
Calcium carbonate	13	——
Calcium nitrate	54,800	——
Calcium oxide	1,320	600
Magnesium bicarbonate	1,954	——
Magnesium carbonate	1,800	——
Magnesium hydrate	8	——
Magnesium sulphate	332,000	——
Magnesium chloride	540,000	——

These reactions result in three distinct sets of phenomena, whose relative importance is determined by the character of the combined elements. These are, the formation of scale, the corrosion of the metal parts of the boiler, the foaming or priming.

SCALE

The formation of scale is the most serious and the most general result of the use of what are known as hard waters. Scale consists generally of concentric layers of a crystalline deposit of calcium and magnesium salts, together with the bulk of the silica and organic suspended matter, and its presence even in very thin layers seriously lowers the rate of heat transfer through the boiler tubes and may cause "burning out" of tubes.

The character of the scale depends almost entirely upon the nature and method of combination of the constituents in the water. In a very soft water the excess of carbonates precipitated carries down a greater portion of the calcium sulphate, and hydrate and oxides of magnesium; the scale is generally soft and bulky and a considerable portion of the precipitated matter comes down as a sludge which may readily be blown out of the boiler. This action is accelerated where the water is muddy and contains a considerable quantity of suspended matter.

On the other hand, and especially where magnesium salts and sulphates of calcium are high, and where the water is very clear, the scale is likely to come down as a very dense compact coating over the tubes, which is exceedingly difficult to remove and greatly reduces the transmission of heat, with the attendant danger of blistering the tubes and causing bagging in the sheets.

CORROSION

The exact nature of the corrosive action of boiler water is not clear. It is probably due to several causes; presence of free acids originally present in the water, to the organic acids formed by the decomposition of organic matter at high temperatures, to the presence of free CO_2, excessive dissolved oxygen, and to the acid radicals originally combined with the iron, aluminum and magnesium which have been precipitated as hydrates. These acid radicals will probably recombine with the carbonates, if present, but if the acid radicals are in excess, conditions may arise in which they will be free to combine with the iron in contact with the water.

FOAMING OR PRIMING

The exact causes of foaming or priming are not well known. It is probably due, at least in part, to the effect of the dissolved salts (in high concentration) on the surface tension of the water, which prevent the free escape of the bubbles of steam gas. The presence of finely divided scale and excessive organic matter, in some cases, have been held to be contributing factors. Apparently the design of the boiler and the rate and manner in which the steam is taken off has a very considerable effect on this difficulty. If we assume that the fundamental cause of the trouble is the presence of alkaline salts and high concentrations, Christie, in his "Boiler Water," has given some figures showing the concentration at which foaming may be expected to begin. Expressed in parts per million, they are as follows:

Locomotive	2,500 to 3,500
Sterling	4,000 to 5,000
B. & W. and Heine	5,000 to 7,000
Horizontal tubular return	8,000 to 10,000
Old type return boiler	17,000

The limiting factor in the treatment of water by the lime soda process is apparently the trouble due to foaming caused by the excessive amounts of reagents that must be used. This is due to the fact that all of the sodium put in as carbonate or hydroxide remains in the treated water. The practical limit seems to be water carrying about 900 parts per million of permanent hardness. Assuming that it contained in addition some 100 parts of non-incrusting solids and that the permanent hardness was made up of 200 grains calcium sulphate and 700 grains of magnesium sulphate, the water would require 163 parts of soda ash and 465 parts of sodium hydroxide, which would result in the treated water containing some 1,150 parts of dissolved solids. If this water were used in a 500 horse-power B. & W. boiler driven at its rated capacity the boiler would foam in about 14 hours.

PURIFICATION

The problem, then, is to remove these deleterious substances or render them less harmful. This can be done either by the purification of the water before it enters the boiler, or by the addition of substances to the water as it enters the boiler. In one case, precipitation takes place outside the boiler; and in the other, in the boiler itself.

It is apparent that if we can cheaply and economically remove these deleterious substances prior to the entrance into the boiler, this would be the most desirable and efficient method, but the necessary apparatus is a matter of some expense and ground space, and it requires supplies, repairs, attention and supervision. On the other hand, boiler compounds are applied practically without any supervision and with a minimum of apparatus.

Cost of Service Forms Only Equitable Basis Upon Which to Establish Rates

J. M. Spitzglass Declares Discussion Resolves Itself Merely to the Proper Apportionment of Expenses upon which the Cost of Service should be Based—Customer should be Called Upon to Share in Expenses to Provide Reserves He is Free to Utilize to the Maximum Extent—Extra Charges for Expenses in which He has no Choice, Such as Distance from Plant, can not be Equitably Imposed

There is no way out of the fact that rates for public utility service in order to be equitable and fairly competitive must be based only upon the cost of the service to the company for supplying the individual consumer, declared J. M. Spitzglass, of the Peoples Gas Light & Coke Company of Chicago, in his paper on "Where We Stand in Rate Making for Gas or Electricity," presented at the annual meeting of the Pacific Coast Gas Association. This statement is not concerned with the fact whether it is actually possible to determine the cost of service to each individual consumer or not, and to whatever degree of accuracy this determination can be accomplished. This principle should be established first.

In as much as a given customer is responsible for the expense to the company by his free choice of action, that customer should in equity to all pay for that expense. Assuming that the cost of service can be easily and accurately determined for each individual customer, what excuse can there be for charging one customer less than the cost of serving him and to charge another customer, to make up for this, something in excess of the cost of serving him. It would seem that the equity of the "cost of service" theory in addition to being established by law could also be proved by successful operations of the free market.

When things are offered for sale the price is always determined by the cost to the seller, while the value of the article to the buyer in all cases regulates the quantity of the sale; that is, by making the selling price of the article in certain cases to be lower than the value to the buyer, which may be also lower than its cost to the seller, the amount of sales will necessarily increase, but the increased sales will not necessarily bring any profit and, therefore, the seller would be much better off if the unprofitable sales could be avoided.

It seems to me that in the case of regulated utilities, where the question of over-production is entirely eliminated, there should be no proof necessary that the maximum result will be obtained when prices of the product will be made to follow the actual cost, and yet we have seen that the "value of service" theory is rooted very deeply in the minds of many rate advocates.

Some are, after the example of railroads, carrying low priced goods at lower rates than higher priced goods, or, after the postage regulations, charging lower prices for lower classed mails. There is this difference, however, that neither the railroads nor the post office furnish the same kind of service to the lower as to the higher class.

The customer has no choice in regulating that service and, therefore, the expense incurred can hardly be traced to the individual customer, as it can be in the case of gas and electric service where the consumer has the choice to demand the service of the utility at any time he may choose to do so.

After all, even those, who would prefer to have a value test indicator for every customer, if it were possible to do it, have always said, nevertheless, that the cost of the service must be considered first, the only difference being that the cost limit is modified by manipulating the expenses of the utility according to certain reasoning one way or another. So the real argument is reduced merely to the proper apportionment of the expenses upon which the cost of service should be based.

Apportionment of Expenses

We are fully aware that certain expenses are originated by the mere fact of having a number of customers. Others are originated by providing the equipment that is necessary in taking care of the individual and collective demands of those customers. Still other expenses are originated by the actual consumption of the product.

If the cost-of-service theory is to be followed, and the customer is to pay the expense incurred by the company for his individual service, we must have a reason why the cost to the individual should be limited to these three factors only.

Why should not each individual consumer be taxed also in proportion to the distance that the product is to be delivered to him?

We know that an increased distance of delivery incurs an expense just as well as an increased capacity does.

Again, why should not the consumer be given a rebate for living in a densely populated section, as one lately suggested, because the expenses of distribution are much reduced in those sections?

There are many other factors that vary with given conditions of service for the various customers. But all these are collective factors in which the individual customer has no choice whatsoever.

Whether he prefers to live far from or near to the supplying station, he has no choice in selecting the location of that station which is supposed to be located most equitably for all the consumers collectively. Neither can the individual customer control the density of the population in his district.

Our basis of apportioning the expenses are, therefore, these items which are left to the unrestricted control of the individual customer, or the items in which he can and will be represented individually and not collectively. The customer can not choose or control the location of the plant. The density of the population in the district where he lives is due to other customers as well as to him, and he can not choose or control that situation, neither can he control the amount that other customers use simultaneously with his demand, and, therefore, he can not be held responsible for it.

The Customer's Choice

The customer has the right of choice in applying for the service of the company, and, therefore, he is individually responsible for his portion of expenses which the company incurs because of the number of customers.

The customer has the choice of indicating the extent of his possible or probable demand in the same manner as he would if he were to provide the necessary equipment himself. This estimate determines his capacity of using the service of the company and, therefore, he is individually responsible for the portion of the expenses incurred by the company to provide and maintain an equipment necessary to take care of his given capacity.

The customer has the choice of using the product as much as he pleases to the limit of his capacity, and therefore he is responsible for the portion of the expenses incurred by the company in providing the necessary product.

Of course, each one of these divisions contains a number of expense items which are necessitated merely by the centralization of the collectiveness of the work. On the other hand, there are so many more items whose expense is greatly diminished proportionately, due to the same centralization or collectiveness, that the customer finds it to his advantage to let the work be done by the company and to pay his share of the cost or expense originated by him.

It should be remembered, however, that the customer does not have to pay for a plant equipment equal to his individual capacity. The company is well aware of the fact that the consumers do not use their maximum all at the same time, and usually installs a capacity equipment equal only to a fraction of the aggregate capacity of the connected load. The capacity of the customer, therefore, is only used as the basis for apportioning the actual expense of the equipment as installed for the need of all the customers collectively.

Fixed Charges and Expenses

It should be borne in mind that the line drawn between fixed and variable expenses, if such a line can be drawn, does not coincide with the boundary of output expenses.

For instance, the expense of supervision in a manufacturing station is practically the same when the station is operated to its full capacity as when it is operated only at a fraction of its capacity. Nevertheless, the function covered by this expense is of value only to the actual output of the station.

Here again the line must be drawn with reference to the individual customer as if he were to provide himself with the necessary facilities for securing the same kind of intermittent service.

The fact that the service is intermittent and the product is not used uniformly results in an increase of the cost of operation as well as an increase in the cost of the necessary equipment. The individual who provides an isolated plant for himself knows that his investment cost will be the same whether he uses the equipment or not.

At the same time he knows also that the equipment must be large enough to take care of the possible maximum that he may ever need, and he orders the plant to be of the corresponding size or capacity.

He knows also that it would be somewhat cheaper to keep the machinery running uniformly and continually if he could use the same amount of the product all the time, but whether he uses the product uniformly or intermittently the expense is incurred for the sake of producing the necessary quantity small or large as it may be and, therefore, the expense whether made individually or collectively must be charged to the quantity produced.

Classification of Items

The scope of this paper does not allow me to go into the details of apportioning the numerous items of expense under the respective headings of the divisions named. I would propose, however, the following to be used as a guide in performing the necessary classification:

If an item of expense is of such a nature that each individual customer is liable to demand an equal share of attention or service, that item is a customer charge, and the expense should be apportioned equally among all the customers of the company.

If an item of expense is of such a nature that it would continue practically the same for an individual consumer having an isolated plant at the time when that plant is not in operation but maintained in shape for future operation, that item is a capacity charge, and the expense should be apportioned to the aggregate capacity of all the customers.

If an item of expense is of such a nature that it becomes necessary only when the plant is producing and delivering a given quantity of the product, that item is an output charge, and the expense should be distributed per unit of quantity produced and delivered.

The Three Departments for Clearing Expenses

Perhaps the best method of apportioning the expenses is to imagine the company as being actually divided into three independent departments: one for taking care of the customer's applications, billing, collecting, attending to complaints and the various other items that each customer is liable to require an equal share of attention; a second department for taking care of the customer's capacity and for providing the necessary equipment, which, for the sake of economy, is provided in a measure to take care of the needs of all the customers collectively with a sufficient allowance for safety; the third for taking care of the manufacture and the delivery of the product for consumption. By clearing all accounts through these three departments the major part of the expenses would naturally classify itself directly under the proper subdivisions. Certain items would refer to two departments and some would refer to all three, but these could justly and adequately be pro-rated over the direct expenses of each department.

Profit or Return

In the actual subdivision of the expenses there would be some question regarding the apportionment of the profits to which the company is entitled. It is true that those who have the welfare of the utility at heart always "look to the sale of the product to obtain a profit," in spite of untold regulation fixing a rate of return to the capital invested by the company.

The company is organized for a definite purpose which originally and finally is the supply of the commodity to the customer. For that purpose the company has to establish three departments. One department takes care of the relations between the company and the customer; the other department takes care of the necessary equipment; the third department does the actual production and distribution of the product. In such cases there are only two logical ways of allowing reasonable profits on the transaction. One is to consider each department as a company by itself and to allow a reasonable percentage of profit on the amount expended by each department.

The more logical way, however, is to consider the first two departments as subordinates in nature and running at cost, and to allow a reasonable profit per unit of quantity sold. This arrangement should be preferred because it has the advantage of having the seller interested in the extensive use of the product from which he derives his profit. The methods usually employed of allowing a certain rate of return on the capital invested by the company is very inadequate and uncertain at the best. In the first place it diverts most of the profit to the capacity department which is only subordinate in nature and may not participate in the profit at all. In the second place it offers a premium to parties who are not utilizing the investment to good advantage. In the third place it involves considerable expenses in determining the actual amount of the investment. In the fourth place it offers no initiative or incentive to produce efficient operation.

Besides, this arrangement has no logical reason for its existence, because it is just as unreasonable to fix the profits on the gas sold only by the amount of capital or by the expense of the investment, as it is to fix the profits of any other article by the total amount invested in the business.

Factors of Collectiveness

It remains for us to consider a few factors which in the course of the development were usually given such an undue prominence that they have side-tracked the main principles of the subject. It is of the utmost importance to study the load factors, the demand factors, the diversity factors, and the probable maximum demands of the various parts in a given system, mainly for those who have to take care of that system and to provide the necessary facilities.

Those factors are the life of the central station, because the more accurately they are determined, the more efficient becomes the operation, and the greater the chances of centralization and collectiveness. But why should these factors be allowed to blur the subject of rate making is more than I can explain.

The individual who considers the building of a plant for himself, or, who is building or enlarging his own plant, can not be guided by the actual maximum demand that will be indicated at some future date. He estimates the capacity, but also allows a liberal margin, if he is wise, and pays for the full equipment, irrespective of the fact that the actual maximum demand may never reach the full capacity of the equipment.

This reasoning should take care of the demand factor in the case of the collective organization. One person will reach a higher mark, another person will reach a lower mark, but everyone is free to go to the limit of his capacity, and so there should be no worry if some of the customers even put a reasonable overload on their capacity. This is done very frequently in an individual plant and there is no reason why it should not be recommended also in a collective organization.

Now, as to the other factors. Each single burner is subject to a load factor, that is, it may be used all the time and have a load factor of 100 per cent, or it may be used part of the time and not to its full capacity and have a load factor determined by the corresponding fraction. (This would be the so-called capacity-load factor.) When two or more burners are supplied from one source, they may have a diversity factor, that is, they may utilize the equipment of the source of supply at different times.

Of these two the load factor will take care of itself as far as the rate is concerned. The load factor is entirely at the control of the customer, and he may make it as large as he pleases—which is to his own advantage because it reduces the cost of equipment expense to him per unit of the product. On the other hand, the diversity factor is a matter of collectiveness, the same as the lengths of the mains or services, the distance from the station or from the main and the density of the population in a given district. As to the actual maximum demand of the individual customer, what difference does it make after a definite amount has been expended for the equipment necessary to take care of the customer's capacity, individually and collectively, whether the customer was entertaining a party and using his capacity simultaneously with many others, or whether he was all alone in the dark at the opportune time of the peak in the load curve?

Recommendations

Basing my views on these principles and taking into consideration the actual progress that has been made in developing differential rates for public utility service, I wish to enumerate those

recommendations which are especially fitted to the needs of the gas utilities at present.

Whatever system of accounting you employ and whether you consider differentiating your rates immediately or not, have all the accounts of your system cleared regularly into the departments of Customer, Capacity, and Output. This will enable you to determine the actual cost of service to the various consumers, and to know definitely which customer is supplied at a loss and which brings in a profit.

As you know the number of your customers and the corresponding output of each customer you should also establish a practical record of the respective capacity of those customers. This is done in one way or another, by practically all electric companies. It may be said that this will involve an additional expense to the company. That is true, but the expense is a mere trifle; it will probably cost a little more than reading a meter, but it has to be done only once a year for each customer and, besides, the record of the capacity is no less important than the record of the consumption.

Establish a system of unit cost for each department and let your records show from month to month: Unit cost per customer per month; unit capacity cost per ⅜-in. opening (10 cu. ft. per hour capacity) per month and unit cost per thousand cu. ft. of gas produced and delivered to the consumer.

Abolish the practice of recording the various customer and capacity expenses as so much per thousand cu. ft. of gas because there is no relation between these expenses and the quantity of gas produced. While you may not have recognized this fact this has been done by the Public Utility Commission and you must allocate these expenses where they rightly belong before you can use them for practical rate-making.

Encourage the establishment of a Central Bureau on Rate Standards. This is of vital importance to the gas industry, and would serve as a clearing house on rate differentials for the individual companies. This bureau should have permanent headquarters at which to collect all necessary material and data on rates and allied subjects. With such a bureau it would be possible for the companies to work hand in hand with the utility commissions, and to incorporate correct principles in rate practice.

The need of such a corporation has long been recognized in the gas industry. In his presidential address to the Indiana Gas Association in 1916, J. H. Maxon said:

"There can be only one correct theory or principle under which fair, reasonable, and equitable basis of charge for gas service may be secured. It is squarely up to all gas men, who have the future welfare of the industry at heart, to get at the facts—to spend the necessary time and money to produce the information that is needed. We must know, ourselves, what we want and what is fair and equitable, before we can hope to convince any one, either regulatory bodies or the public, that our proposals are made for the best interests of both the utility and the customer."

It is absolutely certain that a clear understanding of the fundamental principles of rate making and their proper adoption for cost analysis will lead eventually to the adoption of differential rates that will reasonably follow the cost of the service. These rates will insure the future success of the industry "for the best interests of both the utility and customer." When you are confronted with the necessity of a general reduction in the price of your product, what an advantage it would be to know the actual cost of the product to the various consumers, and to be able to reduce the price only to those who are profitable in order to insure their use of the supply.

You will find that the average price per thousand intersects the cost line at the average consumption, when the capacity is taken into consideration. If you are to make a reduction in the price, let the per cent of reduction for every step be proportional to the per cent of the reduction in the cost, and let the steps begin reasonably from the points of the average consumption for the given capacity. This should be done because, in the first place, the reduction to the small consumer, as long as it is the same percentage of the reduced cost, will result in the same proportional development of business as the reduction to the large consumer. In the second place, the small consumer forms the basic part of the business, and as soon as he is assured of the same treatment as the large consumer, you have him for a friend and working for the mutual benefit of himself and the company.

We have heard recently of various Demand or Capacity differential rates adopted by gas companies, but the fact is that none of them are designed to interest the average consumer in a manner that can be compared with the electric rates for residence and small industrial customers.

Practical rates do not have to follow the exact line of the cost curve. But in order to be just and equitable, and also successful, they must be based upon the right principles and tend to approach the cost of the service.

If a rate is so arranged that the reduction in price does not begin close to the point where the average consumption is reached for the given capacity of the consumer, that rate is not based upon the right principle.

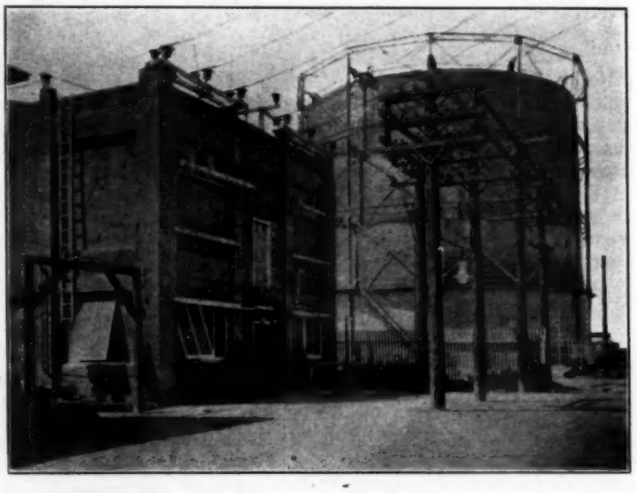
If a rate is based upon the demand of the customer and no charge is made for capacity except for what the customer actually demanded, that rate is not based upon the right principle.

If a given rate offers a reduction in price for a specific use of the product, irrespective of the cost of the service connected with that use, that rate is not based upon the right principle.

If a rate is so arranged that it allows the same reduction in price for various quantities, irrespective of the capacity of the customer, that rate is not based upon the right principle.

If a given rate offers an unrestricted use of capacity at all times but differentiates in the charge to certain customers for that capacity, that rate is not based upon the right principle.

Rates based upon right principles should not discriminate between the large and the small consumer. They should offer to each consumer the nearest possible approach to the actual cost of the service.



SPLENDID APPEARANCE OF THIS HOLDER AND SURROUNDINGS HAS GIVEN RISE TO MUCH FAVORABLE COMMENT

Redwood Cal., Holder and Surroundings an Ornament to Section in Which It Is Located

Van E. Britton Describes Means Adopted to Overcome Objections of City Authorities—Holder has 500,000 Cu. Ft. Capacity

In the early days of the gas industry, holders, or gasometers as they were then called, were housed in brick buildings for the dual purpose of protecting them from the elements and keeping the gas at an even temperature. Holders were small then and it was an easy matter for the engineer to so protect them, but in these days such procedure is out of the question.

So, since those pioneer days holders have been built in the open and attention has been given to protective coatings of paint to preserve the metal and steam coils to keep the water in the tank and cups from freezing. Usually holders have been located at the gas works, and gas works have been generally found in the manufacturing districts where utility was always placed before beauty and civic pride.

The development of high-pressure gas distribution, however, has made it necessary for the holders to be built on or near the end of the transmission line in order that an assured supply of gas for all their consumers is available. Such holders are needed in the event of repairs being necessary on the pressure line.

This was the situation at Redwood City some two years ago when it was decided to build a holder of 500,000 cu. ft. capacity, that being, roughly, a day's supply for the district.

In the carrying out of these plans the company met opposition on the part of the city authorities who had in mind gas holders of the type described in the foregoing. Van E. Britton, assistant engineer of the gas department of the Pacific Gas & Electric Company, thus describes the means adopted to overcome these objections:

The officials of the company promised an artistic structural shape, a pleasing color of paint, an ornamental fence, and a landscape garden around the holder; whereon permission was granted for the building of the holder. The accompanying photograph shows the completed work and how well the promises were kept.

Manager Florence has been the recipient of many congratulations from the residents of the section over the splendid appearance and upkeep of the company's property.

Granite curbing of substantial standard width, cement sidewalks, with the parking neatly gravelled, make the street frontages of the holder lot conform to the civic requirements.

Within the high artistic wire fence are clean, gravelled walks with extensive lawns and flower beds and ornamental shrubs placed advantageously.

In the corner of the lot facing toward the street is the company's emblem of the circle and triangle built of concrete with raised letters of the same material all embedded in a lawn kept neatly trimmed, as, also, is the low-growing hedge which outlines it all.

The holder itself is ninety-eight feet high and one hundred feet in diameter. It is painted as nearly as possible in imitation of the popular travertine of exposition fame.

One of Greatest Uses to which Gas can be Put in Industrial Field is that of Forging

W. A. Ehlers Indicates Fields of Great Possibility in Industrial Gas Branch—Need of Economical Equipment and Suitable Rates

One of the greatest uses to which gas may be put in the industrial field and one in which perhaps the least has been accomplished, is that of forging, declared W. A. Ehlers, industrial fuel specialist of the National Commercial Gas Association, in his paper on "Experiences in the Industrial Fuel Field," presented at the recent annual convention of that association. When I speak of this I refer to the larger work being done in our railroad shops and exclusive forging plants throughout the country, he continued. I have visited a number of plants in various places where the nominal consumption of fuel oil ranges from forty to fifty thousand gallons per month, or the equivalent to a gas consumption on a B. t. u. basis of from nine to eleven million cubic feet per month, yet up to the present moment we have not produced economical equipment or adopted suitable rates to acquire this very attractive business.

So acute is the fuel oil situation becoming that I have been told by the shop superintendent of a large plant in New York State that their engineers are at work on the development of other fuel for forging purposes.

To-day is a golden opportunity for the gas industry in industrial fuel development, yet we have not the equipment in which to use our product as economically as it should be. We need some co-ordinating effort put forth to bring our product up to the highest state of efficiency, which can only be accomplished by the adoption of the regenerative and recuperative principles in the matter of furnace design.

House Heating Offers Great Possibilities

The field of house heating offers great possibilities for the sale of large quantities of gas, and this outlet for our product should not be overlooked. Here again you will find the utility of our product the controlling factor. The progressive spirit of several of our larger companies has been evidenced by the adoption of new and unprecedented methods for acquiring this very attractive business. However, with one or two exceptions, even the lowest rates offered are too high to make the proposition of house heating with gas attractive even to the wealthier class of people.

The success or failure attending our efforts in the industrial fuel field will largely depend upon our attitude towards the following essentials: First, a vision of the possibilities for gas fuel; if our vision is narrow then it follows that our results will be limited,—second, on the kind of men we select to handle the great variety of problems which come up for solution; shall they be technical men, with experience, and competent to solve physical problems, or shall they be simply good guessers?—third, on the type and character of the furnace or appliance selected for certain work; which requires an intimate knowledge of the requirements of different processes and the best equipment to accomplish the result desired,—fourth, on the method of approach in presenting your proposition to the factory manager or person in authority and the subsequent interest taken in obtaining the very best results for your fuel.

Let me here emphasize the necessity for a careful survey of the plant to ascertain the requirements and determine whether or not under the existing rates and conditions you have a feasible proposition to offer before you attempt to interest your prospect in the use of gas fuel.

Get your data in concrete form both as to the present method and your proposed method, and if you have confidence in your analysis sufficient to sell it to yourself, you should then have little trouble in selling it to your prospect.

Exercise great care in the proper installation of the appliance, with due regard to getting not only the maximum results, but also ease of operation and control.

Follow every installation closely for a short while after it has been placed in operation and see that care is being exercised in the proper adjustment of the burners, also that the gas is not being used wastefully.

Check up results obtained and note how they compare with the estimate of results you proposed to accomplish, and finally, fix in the mind of your customer the desire of your company to render service.

Gas Cuts Cost of Soldiers' Meals—Cooking for Thousands at Exhibition Camp

Gas equipment is supplying properly cooked food for the troops stationed in Toronto. The sergeant cooks and their assistants who prepare the meals are happy men these days. They find cooking with gas quite an easy and pleasant task compared with wood and coal, as they had at Camp Borden.

With gas stoves, there is no delay, and the meals are far better cooked. The cooks find satisfied soldiers to be very pleasant companions, but keep them waiting for their meals or serve them partially cooked meals and the reverse is the case. A soldier's work is strenuous, carried on in the open air, and they need good food properly cooked. The illustration herewith is a photograph taken of one of the seven Exhibition Camp kitchens. Note the number of ranges in use. The cost of gas used to cook the meals for each man has been figured less than half a cent per day. This low cost has been made possible only through gas equipped kitchens, and nothing but blessings are heard in Toronto regarding the soldiers' cooking arrangements.

COSTS LESS THAN HALF A CENT PER MAN FOR GAS TO COOK SOLDIER'S MEALS ON THESE RANGES

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Getting the Heart Back into the Work

The evolution of the relations between "master and man" is happily contrasted by a writer in the November issue of *American Industry*. In the past, he reminds us, the "master" was constituted by what might be termed a fellow workman, though elevated above the "man" to the extent of being able to instruct and teach him. To-day the "master" is most generally represented by the corporation, and the bond of contact, of personal acquaintanceship, is gone. The result has been the loss of the feeling on the part of the employee of a real interest in his work and a direct interest in the welfare of his employer. "Some way must be found," concludes this writer, "of getting the heart back into the work."

Many gas companies have already realized this and several have already taken steps with a view to doing so. Perhaps the efforts they are making, and the expenses involved in them, even though undertaken only after most careful consideration, will not result in the desired object. Whether they are directed along the right channels or not, is more than any of us can prophesy. But the fact remains that the need is recognized. Somehow and some time the problem will be effectively solved, for that is the way of the modern gas business.

Retaining Equipment in Service Until It Has Worn Out

"The equipment in steel mills seldom wears out," is the significant assertion of an authority on that subject, who explains that developments and improvements have been made with such rapidity that almost invariably it becomes economical to scrap machinery that still has half its useful life ahead of it, and substitute for it some of the newer developments.

This is a thought that should be carefully weighed in the gas field. Those qualified to speak with authority tell us that great changes are taking place in our field, and that marked improvements are still being made in the equipment of plants for the manufacture of gas. One instance is cited of a plant designed only three years ago, and not yet in operation, which, in the opinion of one well qualified to speak, is already obsolete.

It sometimes seems almost a sacrilege to dismantle machinery that has not yet begun to show signs of wear, and replace it with newer, and, perhaps, more expensive apparatus. But quite frequently such a course is downright economy in the end.

It is not a step, however, that should be taken on impulse. The arguments pro and con should be very seriously considered, and the action taken only upon the advice of established experts. The thought, however, as has been stated, is well worthy of consideration.

By-Product Research Work

The present European War more than any other one thing has taught us how much we depend upon the by-products of the gas industry. This dependence is largely upon the coal tar derivatives, the research work on which has been carried on to a very great extent in Germany. As a result, now that all trade relations are practically cut off between the United States and Germany, we are forced to pay more for our medicines and for our clothing in the manufacture of any part of which coal tar products enter.

It has been complained that coal tar derivatives cannot be manufactured in this country because of the lack of protection given them by the government. There is, however, a good deal of research work going on in this country at this time. Some of this work is being done by educational institutions, some by gas companies and some by concerns in other lines of business. For the most part, it does not seem to be very well co-ordinated. It seems that most of the work is due to independent effort and that it is not of a co-operative nature that will result in the greatest ultimate strides.

Would it not be better for a gas association, since the success of this work is so vitally interesting to the gas industry, to undertake to join the hands of all those who are working along this line so that what one does will help the other? If this were done there is every reason to believe that authoritative information could be presented to our law makers which would make it possible for them to intelligently pass laws which would protect the industry after the war.

As matters now stand there are probably not many gas men or chemists who know just what must be done to give this protection.

With all those who are vitally interested in the subject working on it together it is apparent that better and more intelligent results can be obtained. Often the good that an organization does lies as much in the authoritative information that it is able to give to governmental or law making bodies as to the research work that it does.

Industry after industry has demonstrated that where all the units of the industry work together in securing reliable information and giving wide publicity to this information laws will eventually be made that will be fair to that industry. However, if the leaders in the industry cannot agree, and if there is no recognized association in the industry that deals with that particular phase of the industry it is apparent that the law makers can never secure sufficient reliable information to base such legislation upon. The result is that the industry is either over or under protected. In either case it is bound to suffer in the end.

The remedy for the present gas by-product situation appears to be closer co-operation on the part of all those who are doing research work along the line of chemistry, manufacture or marketing, and more complete and wider publicity on the needs and possibilities of this phase of the gas business.

Criticism

Not long ago there appeared in one of the big national magazines the story of a little, narrow-minded man who had inherited a big job, and, who because of the fact that he was able to hold on to it—the nature of it being such that he could not very well lose it—he felt that he was just as big as the job.

There also appeared in this same magazine the story of a broad-minded man, who had inherited nothing but who soon made for himself a really big job. Each story traces the progress of its hero. The narrow-minded man through over-confidence comes to grief. The broad-minded man wins and attains an enviable degree of success.

These stories show that the only really essential difference between these two men was that the little man was not open to suggestions that did not accord exactly with his previous method of reasoning. Criticism he could not bear at all. The big man on the other hand was always open for suggestions. He always kept an accurate record of all suggestions made. He welcomed criticism and he and his business prospered until he dominated all his competitors.

Isn't this lesson well worth taking to heart? After all, the great difference between the truly great man and the little man is mainly the spirit in which he takes criticism and suggestions, and the use to which he puts them.

The Necessity of General Enlightenment of the Public in Regard to Gas

For some two thousand years it has been constantly taught that the way to make others believe what you believe is to teach them while they are yet children. It has been taught and demonstrated that the earlier a child can be instructed in regard to the wisdom of a certain course the more likely it is that that child will adopt that course when it attains to manhood or womanhood. Our competitors in the electrical field have demonstrated that they realize this, as is demonstrated by the large number of courses dealing with electricity in our schools and the especially energetic efforts often made to get electric lights into school rooms. In fact there seems to have been a marked effort made to relegate gas to the manual training and the domestic science rooms where it is used for heating purposes only, and even here, gas is not passively permitted to reign supreme for even now electrically heated appliances are finding their way into the school house.

This state of affairs is far more serious than most gas men apparently realize. It is so serious that it would pay the gas industry if each gas company would offer to the local school board the services of its best qualified man to give a course of lectures in the public schools on the subject of gas, its uses and its manufacture. It will be far better and cheaper to teach the children while their minds are open and their opinions are not firmly fixed than it will be to wait until they grow up and their minds have narrowed and they are strongly prejudiced in favor of electricity.

Gas men sometimes make statements similar to this: "It looks as though Providence was always with the electric man. The public seems to always take his side." These men have possibly overlooked the fact that nearly everyone knows more or less about electricity. Extensive publicity is given it and there is a degree of glamor attached to it and the things it will do that cannot be denied. In this connection, too, one must not overlook the exceedingly large number of simple, easily-operated electric devices that can be found in most any child's collection of toys. The electric industry for many years has been reaching out after the young. To-day the results of this effort are beginning to bear fruit.

Unless the gas industry also takes a very active interest in the education of the children, especially in teaching them about the production and the uses of gas, a serious situation is likely to be met with.

The gas man should find his way into the schools, and, in them, spread knowledge as to his product.

Co-operative Publicity

"Our publicity methods with few exceptions compare unfavorably with those of any other industry representing an equal amount of capital."

These words are taken from a paper presented at the American Gas Institute Convention at Chicago. In these days when advertising is used to a greater extent than ever before to effect the sale of all commodities such words are charged with meaning. If they are true it surely is time that better methods be adopted. In order to decide upon the particular method it would be wise to study the methods pursued by other industries, especially those industries using co-operative publicity.

Among the co-operative campaigns that have been carried on during the past few years or are now being carried on we find the following. A fertilizer campaign addressed to farmers, a wooden barrel campaign addressed to oil producers, and toilet goods advertised to stimulate a summer demand. Car wheels, oranges, apples, cranberries, hemlock, sewing silk, railroads, cement, life insurance, safe deposit vaults, underwear and Florida communities have also been advertised in a co-operative way. The advertising which has been done to introduce butterine and other butter substitutes has been so successful that the dairy products associations became somewhat alarmed and investigated the situation. As a result of this investigation a comprehensive campaign has been launched.

In order to launch a campaign for Barre granite that would be most effective three years were spent in preparatory work. That campaign is now securing results.

The retail dealers of Springfield, Mass., found the returning of purchases becoming a very serious problem. Many of these goods were returned on account of thoughtlessness on the part of the purchasers. The retailers, therefore, carried on an educational publicity campaign co-operatively. This has resulted in checking this evil.

The wide publicity given to their product by steam and hot water house heating equipment had so great an effect upon the sale of hot air furnaces that the manufacturers of these furnaces combined in a co-operative advertising campaign featuring the many advantages of heating the home and other buildings with hot air.

The great success that has attended the co-operative publicity work that the electric interests have been carrying on for several years requires no comment. At the time of the "America's Electrical Week," held from Dec. 2 to 9, the Society for Electrical Development was composed of more than 1300 separate units representing electrical manufacturers, jobbers, lighting and power companies, dealers, contractors, trade publications, etc. The industry then had an invested capital of about eight billion dollars. Collier's, Leslie's, Scientific American, and Scribner's published electrical numbers and the whole exhibited a fine spirit of co-operation.

The first and the only national co-operative advertising campaign that the gas industry has ever carried on was inaugurated before there was as much information in regard to possible results and the best way to conduct it as there is available to-day. Another campaign would undoubtedly be far more effective and successful than anything that has ever before been done in the industry. The experience of other industries would also suggest that such a campaign would be more productive if directed by a co-operative organization confining all its activities to co-operative gas publicity than it would if directed by one of the present gas associations.

Should the Gas Associations Publish Advertising in their Annual Proceedings

Matter Brought Up by Michigan Gas Association Gives Rise to Divided Opinion—Comment of Leading Engineering Journal on Inclusion of Advertising in Publications of American Society of Mechanical Engineers

Pointing out that his association had available $1,000, of which $500 is required towards reconstruction of the laboratory at Ann Arbor and the balance for printing and binding the 1916 Proceedings, Clark R. Graves, secretary and treasurer of the Michigan Gas Association, called the attention of the AMERICAN GAS LIGHT JOURNAL to the fact that the problem of raising additional funds for the association's work was imperative, and asked for its opinion in regard to raising a part of such funds by including advertisements in the Proceedings.

This journal responded, stating that such a course could, in no wise, be objectionable to it in the competitive sense, but on the contrary might even prove of advantage. It further stated that, while it regarded the technical discussions and interchange of thoughts and experiences, which constitute the bulk of the matter in the editorial pages of the technical journal, of inestimable value to the engineer in his work, it did not lose sight of the fact that a knowledge of the available tools of his trade is just as important to the gas man as a knowledge of the principles underlying such work. Since this journal is convinced that the subscriber who confines his attention exclusively to its editorial pages, and neglects the advertising pages, loses half the value the journal has to him, it did not see how it could consistently take the stand that the inclusion of advertising in the Proceedings of the Michigan Gas Association could in any way detract from the value of that publication, providing the matter was pertinent.

At a later date Mr. Graves replied to this letter in part as follows:

"Further bearing on the letter of the Michigan Gas Association soliciting advertising from Manufacturers to help defray the cost of issuing our yearly Proceedings, we have abandoned this entirely for the present as the matter was taken up with different gas journals, and some were in favor and some were not. Therefore, we do not feel we can lose the good-will and co-operation of any of the gas journals, and thought it might also be considered a hold-up by the manufacturers.

"At the time we were figuring the cost per page, we secured from the other state associations their charges to manufacturers per page. They have been getting $10 and going to raise the price at the next meeting. It is interesting to see we do not consider it good at any price, and other associations are not even backward in raising the price. This is a matter which I thought should be brought before the manufacturers that we do not solicit advertising and should also be appreciated by the journals.

"Some time ago the Michigan Gas Association had been securing $33 from each of the gas journals to help defray the expenses of the Stenographer for reporting the meetings. This saved expense on the part of the journals in not having to send a representative. You will recall this has also been done away with.

"Please accept the thanks of the Michigan Gas Association Executive Committee for your recent frank letter regarding the proposition."

Almost simultaneously with the receipt of Mr. Graves' letter there came to our attention an editorial in the *Engineering Record* dealing upon the same topic. The following expressions have been extracted from this editorial:

"The American Society of Mechanical Engineers has recently asked its members to express their attitude toward the publication of the book known as *Condensed Catalogs*. The volume is nothing more than a collection of advertisements and has as its sole reason for existence the revenue that results to the society. In other words, the American Society of Mechanical Engineers has gone into a commercial venture.

"The criticism that applies to the publication by the society of *Condensed Catalogs* applies also to the advertising carried in the *Journal*, though the catalog publication is the more flagrant case because of its absolute separation from the engineering papers of the society. The advertising in both publications, however, is a commercial activity and is as much out of harmony with the spirit that should actuate a great society as would be the selling of mechanical supplies or machine parts.

"The need of revenue is, of course, a poor excuse to plead for this means of raising funds. The end does not justify the means. The engineering profession as a whole, we believe, will commend the society when it ceases its advertising activities."

Thus the attitude of the gas journals mentioned and the decision of the Executive Committee of the Michigan Gas Association finds support in other quarters. There are apparently many who are opposed to this form of obtaining revenue for the support of technical societies. But the devising of a means of obtaining such revenue is of paramount importance. Our State associations as well as our National associations are doing extremely important work,—particularly is this so in the case of the Michigan association—and, in the opinion of this journal, have been very inadequately supported financially.

Vast Quantities of Oil may be Obtained from Distillation of American Shales

It has long been known that some of the shale in the Green River formation in northwestern Colorado and northeastern Utah would yield petroleum when it was subjected to destructive distillation. Petroleum has been obtained from the oil fields, however, in quantities so great and at a cost so low that its production from shale by distillation has not seemed to be commercially feasible, despite the fact that in Scotland such an industry has long been paying dividends on a large investment and, in fact, according to current report, is now supplying fuel oil for the British navy.

Field investigations made by Dean E. Winchester and others, of the U. S. Geological Survey, have shown that whenever economic conditions necessitate or justify the distillation of oil shales for their products and by-products the shales of the Green River formation in Colorado, Utah, Nevada, and Wyoming can be made to yield vast quantities of oil, gas for use in the process of distillation, and fertilizer enough to enrich most of the farms of the Middle West.

In northwestern Colorado alone there is sufficient shale, in beds at least 3 ft. thick and containing more oil than the average shale now mined in Scotland, to yield about 20,000,000,000 barrels of crude oil, which is more than five times the total amount of crude oil produced in the United States to date; and in Utah there is probably nearly as much shale just as rich. This shale oil will yield 10 to 15 per cent of gasoline by ordinary methods of refining. The shale in Colorado should produce not only the oil but also, with only a moderate added cost, about 300,000,000 tons of ammonium sulphate. The industry requires a large and costly equipment of retorts, condensers, and oil refineries, as well as of mining machinery, so that it probably can not be profitably organized on a small scale.

Rich oil shale is exceedingly tough, resists erosion remarkably, and will burn when ignited. As it bleaches bluish white on weathering, the ranchers in some parts of the region refer to it as "white rock that will burn." When freshly broken, it gives off an odor of petroleum. Although oil may be obtained in large quantities from some of the shale by destructive distillation, it does not appear that more than a small percentage already exists in the shale as oil. Furthermore, oil has not been found in commercial quantity in wells that have been drilled into the shale in northwestern Colorado.

In the area examined there is a vast quantity of shale that will yield a barrel (42 gal.) or more of oil per ton, and shale from a thin bed at one locality yielded 90 gal. per ton, or nearly four times as much oil as is obtained from an average ton of Scotch oil shale.

Italian Tests Show Products of Carbonization of Ton of Coal Give 238,500 More Calories Than Does Coal Burned Direct

Italian tests have shown that where a ton of coal burned direct gives 700,000 calories, the coke and the gas (deprived of its benzol) together give 938,500 calories, from 1100 lb. of coke and 8,712 cu. ft. of gas. There is thus a saving of 34 per cent. in carbonizing the coal.

Time Long Since Past when Vendor Could Sit in His Office and Dole out Patronage To Those whom He is Delighted to Deal With

W. W. Cummings and A. H. Vegkley Discuss Subject of Co-operation Among Departments of Gas Companies—Sometimes Inclined to Think that Company's Highest-Paid Help Should be at Telephone Switchboard

Co-operation has been exploited up and down this wide land in every business and from many angles till the principles are as thoroughly and generally understood as those of the simplest functions of our daily life, yet there is no duty so universally disregarded in its application, asserted W. W. Cummings, of the Boston Consolidated Gas Company, in a paper presented before the New England Section of the National Commercial Gas Association, in Boston, Nov. 24.

In this regard we should have one common viewpoint—that of the customer. After all is said and done, his approval or disapproval of our efforts is the one thing that means anything definite; the one thing that means success or failure in a large way for the gas company, and, indirectly, the success or failure of each of us. We all realize that the time is long past when the vendor could sit in his office and dole out patronage to those whom he is delighted to deal with.

Success in every business to-day means a deep and hearty consideration of the welfare and good-will of the customer. We may admit this in a superficial way, may talk about it in a grand way, but the whole thing amounts to nothing unless we get right down to the fundamentals, and produce not results, but *the* results—a contented customer.

Discussing co-operation from our point of view is absolutely sure to breed a bunch of grouches of the most rabid sort. We may mean alright to start with, but we won't go far before the personal element is bound to enter in and we are entertaining feelings about the other fellow that are not complimentary, to say the least.

No man can do business successfully with other men while harboring a grouch. A man can work with his hands and, perhaps, get away with it, but he is positively sure to fall down if he has to come in contact with others in a business way. This happiness at your work idea isn't poppy-cock in the least. Besides changing disagreeable surroundings to pleasant occupations—this attitude is a sure business getter for the salesman, and a salary raiser for the workman.

Importance of Attitude at Switchboard

Forgetting your own private desires in considering co-operation, let the all deciding question be: "What is for the best interests of the customer?" and you won't go far wrong.

Getting down now to particular fields for improvement, the first and most important is the switchboard. The telephone is the most common point of contact of the company and the customer. Through the operator the business in hand is either furthered or delayed. The voice at the 'phone that is sympathetic and interested can hold you while it determines what you are after and puts you in connection with the party who can give the information desired and if it can do this for you, it can for every customer. To carry this out successfully, the operator should know thoroughly the scope and duties of each department and its relative personal make-up. I sometimes think our highest paid help should be on the switchboard, and I am absolutely sure that every operator should pass through a company school before he is allowed to sit at the board.

Incompetent Man Sent Out on Job

The next most offending possibility is an incompetent man who may be sent out on a job. This work calls for a diplomat worthy of service at a belligerent nation's court. Of course we can't get such a one for the pay we can afford to give, but it should be this man's ambition to approach that standard. He generally talks too much and does too little.

If there is a possibility of what is required coming under the jurisdiction of another department, he withdraws more or less gracefully, and leaving the customer in the air without an idea of when the next man will come and with a doubt as to what he will do. The remedy is to find out in advance as far as possible the exact nature of the service required so that the proper man may be sent, and, if by chance the wrong man should be able and willing to go out of his sphere and take care of the customer, he should do it. In a way, such trouble as we are discussing can be guarded against by getting and passing along full details of the case in hand as it comes first hand from the customer.

Company Should Have Ample Stock on Hand

Another vital yet common defect is the inability to supply the customer promptly after he has placed his order. There is a limit to the stock a company can carry and the men it can carry on its pay rolls, still it should have sufficient foresight and have enough of a gambling disposition to provide a little more rather than a little less than it needs. The customer backs and fills while buying; bites the penny, holds off for a lower price, puts off the decision till the last minute and then wants his purchase at once.

Even so, it is best to be able to satisfy him immediately. It doesn't help matters to show him that the delay is up to him. Get him to use gas as soon as possible. That's where your salary originates.

All this is easy if you only go to it, but the credit man is the true artist. To size a man up without being too personal, to tell him he is no good in such a way that he will thank you for it, to deftly decide whether he pays cash because he wants to or because he has to, to judge whether it is best to take him on although his record is poor, or to turn him down as a bad risk; that is a heaven born gift but it loses all its grace if it isn't done in a reasonably short time.

Proper Organization Required First

Discussing the points brought out in Mr. Cummings' paper, A. H. Vegkley, also of the Boston Consolidated Gas Company, stated that we have heard a great many papers on co-operation, but they have, in a great many cases, put the cart before the horse; in fact, started on the wrong end.

To begin with, we first must have the proper organization; the proper head of each department, one who can enthuse his employees, who can by fair dealing, treatment and understanding of the human factor cement them into an organization of men where work becomes a pleasure.

When this condition is brought about, then is the time for all heads and employees to have a get-together meeting, especially those who come in contact with the public.

At this meeting a general discussion as to what each department is trying to do should be undertaken, stating how vital it is to have the support of all the employees, and explaining how by so doing a great many complaints can be eliminated, thus increasing the co-operation between the company and the customer—the consumer of our product.

The next step would be a demonstration of all appliances, explaining in a practical way their uses and abuses. This would enable the employees to answer the inquires of the consumers in an intelligent manner.

Furthermore, when special campaigns are run or prices changed all outside employees should be informed in detail, being given a special booklet containing prices, terms, etc.

While we spend millions to increase the efficiency of our service (new holders, new plants, etc.), what have we done to organize and unite our outside forces—one of our most valuable assets, if properly handled? Instead, we have allowed them to drift by themselves, so that the first thing we know they will become a valuable asset to some labor organization. What brings this condition about? As far as I can see, it is purely selfish interest, the hesitation to impart knowledge so as to increase the efficiency of the working forces which, sooner or later, must be done to keep pace with the times.

A Few of the Troubles That Arise in the Gas Business

Following are a few of the troubles which constantly arise in this business, which could be eliminated to a great extent by the adoption of the above plan:

The shifting around of the consumer from one telephone to another, until the proper party is reached, who, by a little cross-examination, finds out what is really wanted and takes the complaint. This is oftentimes caused by the ignorance of the clerk

answering telephone, or he may not want to put himself out for fear of having to look something up.

Proper instructions not being given by salesmen or fitters when appliances or lights are installed.

Promises made in regard to the installation of appliances or meters, without conferring with the proper department beforehand.

Cashiers telling consumers not to make a payment on their lights unless the trouble, which often is a simple adjustment, is remedied. This applies to amounts put on gas bills, and should be referred to the proper department.

The jobbers will report arc lights out of order, and, if pilot has gone out, will shut it off—or will find a water heater leaking and won't state whether it is a circulating or instantaneous heater. Both collectors and jobbers have reported trouble with arc lights, without stating whether it was a 3 or 5-mantle, inside or outside; whether a globe was cracked, new mantles needed or pilot out.

Comments are often made by employees which reflect upon the employees of other departments. Instead of taking the complaint and referring it to the proper department, they will say to the consumer that the light man doesn't know his business, that the fitter made a mess of things when he connected appliances, or that the jobber doesn't understand what he is doing, that the salesman is only trying to sell something so he can get his commission, or that the high bill is caused by the meter reader, etc.

Often misstatements are made to consumers. If an employee can't answer questions put by consumers, why refer them to the party who can, as by misleading them they come to the conclusion that the company is crooked and trying to rob them?

PROCEDURE TO FOLLOW IN TAKING COMPLAINTS

When taking complaints or orders for appliances, get proper names and addresses, also when it would be most convenient to call—in the morning or afternoon. Get telephone number, if any, for appointment.

By getting this information, a great deal of time can be saved the various departments and extra trips avoided, enabling us to give better service to the public.

After all this trouble is started, the public finally comes to the adjuster who has to straighten these tangles, and endeavors to leave the customer with a feeling of good will toward the company. But often his endeavors are hampered by a lot of telephone calls which could be taken care of by a clerk.

His position is likened to that of a lawyer, and these interruptions are not only unbusinesslike, but also discourteous to the consumer, whom he is endeavoring to advise or argue with.

I hope these few suggestions are taken with good feeling towards all and malice towards none, being for the interest of all parties concerned and the business in general and, while we believe the public should possess patience, but better than patience, an open mindedness and a willingness to appreciate what we are trying to do for them, that the company consider courtesy on the part of its employees the first essential, recognizing in this the best introduction of itself to its patrons, and to this end strives to employ only such persons as possess such qualities.

Older Engineer Should Help to Mold Character of Those Under His Direction

We must bear in mind that the young men who come to us—from the office boy to the college graduate—are not merely flesh-and-blood tools to be used in our work as so much mechanism, but men like ourselves, whose future we shall help to mold. Their destiny is to be worked out, and whatever we can do to make it a high destiny should be done generously and well.

"I do not know whether the ethics of the profession are taught in the schools, but from occasional lapses from the code on the part of the graduates of some of our technical colleges, which have come within my personal knowledge, I incline to the belief that little stress is laid upon the moral side of the engineer's training.

"We must have those who come under our influence understand that no true success can wait upon departures from a high standard of justice and honor. The engineer should be sure he is right, then go ahead; his going ahead, however, should not be rough shod, but determined and effective."—*Extract from recent address of Isham Randolph, consulting engineer, of Chicago.*

Visualizing Cost of Gas

Under the caption "Sense and Cents," the *Monthly Bulletin* of the National Commercial Gas Association cites the following:

WHAT 1 CENT'S WORTH OF GAS WILL DO

Rate 80 Cents per 1,000 Cubic Feet

1. Will cook the cereal, boil the coffee and boil eggs for the breakfast of a family of eight.
2. Will toast fifty slices of bread.
3. Will bake enough biscuits for the breakfast of a family of eight.
4. Will heat an ordinary bedroom for 1 hour.
5. Will heat enough water for shaving for the average man for three weeks.
6. Will heat the baby's bottle for ten feedings.
7. Will heat milady's curling iron every day for a month.
8. Will bring 3 gallons of cold water to boiling.
9. Will furnish 12 gallons of hot water.
10. Will furnish three hours' continuous ironing.
11. Will cook enough soup for a family of eight.
12. Will fry chops for two meals for a family of eight.
13. Will heat and operate a large domestic oven for ½ hour.
14. After being heated, it will operate the oven for ¾ hour.
15. Will singe twenty chickens.
16. Will fry four chickens.
17. Will fry enough waffles for eight people.
18. Will boil enough potatoes for a family of eight.
19. Will sterilize 14 gallons of water for drinking purposes.
20. Will operate a Rutz lighter for 3 days—lighting the top burners as many times as would be necessary where a gas stove is used for preparing all the food of a family.
21. Will operate three large upright mantle lamps for 1 hour.
22. Will make 6 pounds of ice.
23. Will operate a 1 horse-power gas engine for 40 minutes.
24. Will operate a 1 horse-power gas-fired steam boiler for 13½ minutes.

WHAT 10 CENTS' WORTH OF GAS WILL DO

Rate $1.00 per 1,000 Cubic Feet

1. Cook a five-course dinner for six persons, as follows: (*a*) Cream of asparagus soup, toasted bread sticks; (*b*) creamed fish, mashed potatoes, sandwiches; (*c*) prime roast of beef (5 pounds), lima beans, scalloped tomatoes, cauliflower with white sauce, baked yams, corn muffins; (*d*) grape fruit salad, French dressing, crackers; (*e*) fancy charlotte.
2. Bake thirty biscuits and broil a 3-pound steak for 2 cents or five times that quantity for 10 cents.
3. Bake one four-layer cake with chocolate filling for 2 cents or five four-layer cakes for 10 cents.
4. Bake five large angel cakes at five different times.
5. Fry one hundred waffles.
6. Heat water for eight hot baths in summer, five in winter.
7. Cook three meals for six persons.
8. Run a gas iron 20 hours.

Term "Differential Rates" Originated in Gas Industry

In the early stages of rate development, that is, from 1874, when the London Sliding Scale of dividends was inaugurated, to 1891, the year Dr. Hopkinson wrote his famous paper on the cost of electric supply, the term "differential rates" was current only in the gas industry and represented a slight diversion from the "meter" rate in the form of graded discounts for larger quantities of consumption, or a reduction in price for the use of gas for purposes other than lighting, asserted J. M. Spitzglass in his paper on rate making, presented at the annual convention of the Pacific Coast Gas Association. Sometimes discounts were allowed for the use of the product in the daytime, or in the summer season; more frequently meter rents were charged by companies to cover the fixed cost of connecting the customer to the mains of the utility.

News of the Gas Industry

COMPANY WAS FORMERLY HOUSED IN BUILDING ALMOST A HUNDRED YEARS OLD

Ithaca Company's New Building has Auditorium Dedicated to and for Free Use of Ladies' Organizations of City

Auditorium Service Includes Free Use of Gas, Light and Heat as Well as Piano and Moving Picture Machines—Necessary Dishes Provided by Company for Any Social Where Ladies may Desire to do Their Own Catering

The Ithaca Gas & Electric Corporation recently moved into their new office building, and are now comfortably housed in one of the finest and most up-to-date buildings, devoted exclusively to the business of a public service corporation, in the country.

For many years, the company occupied a wooden structure at the same location, which was erected almost a hundred years ago. This building became unsuited for its purposes, and, in addition was a serious obstacle to the progressive spirit which is being evinced by the company. The new building is not only splendidly equipped for the purposes of a public service corporation, but is at the same time an evidence of the company's civic pride in the City of Ithaca.

The new building is three stories in height, is of modern fireproof construction throughout, and has already earned the name of a "Building without Shadows," three sides being almost entirely constructed with windows.

A number of innovations, unique in the gas and electric industry, have been embodied in the building, a notable one being the construction of a ladies' rest room on the main floor for the use and benefit of the public. This room contains telephones, a lavatory and a rest room, splendidly furnished with easy chairs, writing tables, etc.

The cashier and information departments are also located on the first floor, the balance of the space being utilized for the display of gas and electric fixtures and appliances. This floor is of tile, with marble baseboards, the showcases being built around the various pillars. Semi-indirect electric lights, and gas arcs, are used for lighting.

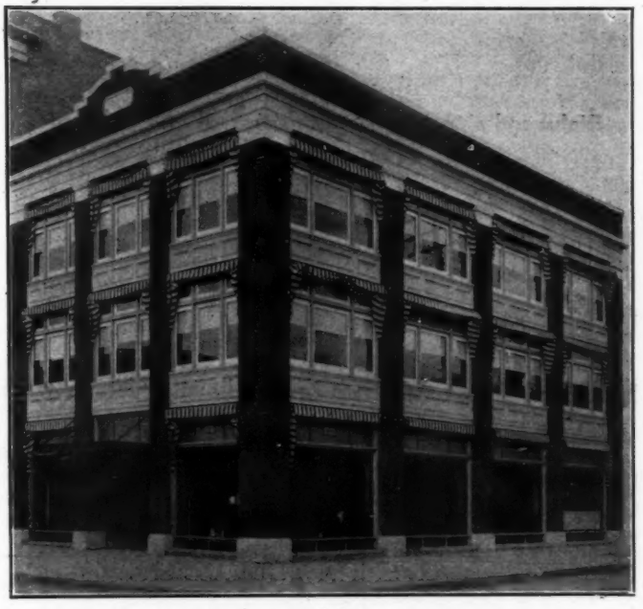
The second floor is devoted exclusively to offices, the executive, accounting, engineering and new business departments being located on this floor. The laboratory department also has its headquarters on the second floor.

The third floor is dedicated to, and for the free use of, the various ladies' organizations of the City of Ithaca, the auditorium seating approximately 250 people. A model kitchen has been provided on this floor, and a gas range incinerator and a water heater are connected. In addition, the Company furnishes the necessary dishes for any social that the ladies may have when they might wish to do their own catering. This auditorium is absolutely free to any organization which might wish to use it, including, of course, the free use of gas, light and heat as well as the piano and moving picture machine furnished by the Company.

Since the auditorium has been opened to the public, it has been used very extensively—at least five times a week—by the various ladies' organizations of this city and it has been the means of promoting a great deal of good feeling on the part of the public toward the company. A great many favorable comments have been made and the ladies have expressed themselves most favorably and in numerous ways have shown their appreciation.

The third floor also contains shower baths for the use of the employees. Combination gas and electric lighting fixtures are used on both the second and third floors. Fireproof vaults have been constructed from the cellar up to the second floor, and Bell inter-office telephones are used.

The Ithaca Gas Light Company was organized and commenced the manufacture and distribution of gas in the City of Ithaca in 1853. In 1884 the Brush-Swan Electric Company commenced the distribution of electricity, the name later being changed to Ithaca Electric Light & Power Company. Both companies were acquired in 1906 by the Associated Gas & Electric Company, the present holding company. During the latter part of 1915, the Gas & Electric Companies were merged under the name of Ithaca Gas & Electric Corporation.



NEW GENERAL OFFICE BUILDINGS EMBODIES SEVERAL INNOVATIONS UNIQUE IN THE GAS AND ELECTRIC INDUSTRIES

J. I. Mange, vice-president of the J. G. White Management Corporation, through whose efforts it has been possible for the company to finance the construction of its new home, is the president of the Ithaca Gas & Electric Corporation, while S. J. Magee (formerly manager) and Mr. C. A. Greenidge are the vice-presidents. T. W. Moffat and H. B. Brown, of New York City, are secretary and treasurer, respectively.

This journal is indebted to J. W. Murdock, manager of the company and O. E. Wasser, auditor, for the foregoing information.

French Government to Control Coal Prices

A bill has just been passed by the French Chamber of Deputies authorizing the Government to regulate price of coal. Coal is very scarce throughout the country. It has been selling in Paris around $31.20 a ton. Placards have been posted throughout the city urging people to reduce consumption of both coal and gas.

High Building Costs Bring Franchise Postponement

The Minot Gas Company which secured a franchise for the installation of a gas system in Minot, N. Dak., more than a year ago and which concern agreed under the terms of that franchise to have such system ready for supplying consumers with the commodity by December 1 of this year, secured an extension of the time in which to comply with the terms of the franchise at the meeting of the city commissioners last night. The holders of the franchise are local people who have incorporated their concern. They contend that it will cost $60,000 more to install the system now than it would a year ago, and that the prices of the commodities which enter into the plant are not only prohibitive, but that it is practically impossible to procure such material at any price. Delivery orders in many of the lines are not taken at less than fourteen months from the time such orders are filed.

National Commercial Gas Association Manufacturers' Section Adopts Official Seal

The Manufacturers' Section has adopted an official seal whose use is restricted to members in good standing. This seal upon a manufacturer's letter head or advertising, according to W. W. Barnes, secretary of the section, is an indication that he has pledged himself to quality goods and that his company is working with other gas men to further development. The Manufacturers' Section members stand shoulder to shoulder for the best interests of the industry. On the back of the official stationery of the section is carried a full list of section members and an active campaign for 100 new enrollments for 1917 is being carried on.

Richmond's (Va.) Gas Budget Calls for $490,000

Superintendent Knowles, who is in charge of the municipal gas plant at Richmond, Va., has asked for $490,082.54 to run the gas works next year. He wishes to improve and enlarge the activities of the department, and asks for a payroll appropriation of $141,918.25, which is $13,807 more than the appropriation for this year—$12,111.

The estimate for extensions is $13,966.29; for coal and oil, $205,318, and for street lighting, $10,880.

Industrial Rates Advance in Northern West Virginia Cities

A schedule of rates for gas supplied for industrial purposes has been filed with the Public Service Commission of West Virginia by the Manufacturers Light and Heat Company, Pittsburgh, which supplies gas to a number of large industries in the northern part of West Virginia.

The rates are to be effective Jan. 1, 1917, and provide for an increase of a fraction less than two cents per thousand cubic feet for consumers using gas for manufacturing purposes in excess of 500,000 cu. ft.

A new classification has been provided for consumers using gas in gas engines in quantities less than 2,000,000 cu. ft. per month at a slightly increased rate. It is optional with the consumer whether he accepts service under this new classification.

The reasons given for the increase are the higher rates paid for gas purchased and the increased cost of drilling operations.

The rate for domestic consumers remains unchanged.

Effect of Chemical Industry on Other Lines of Manufacture

Through one of its committees, the American Chemical Society calls attention, in a recent report, to the state of the chemical industry as affected by the European war. Owing to the restriction of imports during the past year, there has been an unusual development of the chemical industries in the United States, one of the chemical processes that has attracted particular attention being the electrolytic process. One of the products of this process is sodium hypochlorite which is used for bleaching purposes by paper mills which formerly purchased bleaching powders and liquids. It was found that, owing to increased costs, they were warranted in installing their own manufacturing plants. This has created a demand for rotary converters and other electrical appliances for this work which are manufactured by the great electric manufacturing companies of the country.

There has been a large increase in the number of by-product coke plants which are utilized in the production of many compounds formerly imported from Germany. The products referred to include: benzole, which is used for motor and chemical requirements; solvent naphtha, used in the rubber industry; tuluol, for chemical and explosive purposes; carbolic acid, the basis of a whole battery of pharmaceutical compounds; disinfectants, explosives, etc.; cresylic acid, for disinfectant and chemicals; naphthalene, for coal tar colors and other purposes; creosote light oils, for disinfectants and wood preserving; sulphate of ammonia, used in making fertilizer. The initial processes require a large number of motors for their operation.

North Shore Towns to Get Lower Rates

The schedule arranged with the North Shore (Ill.) Gas Company has been announced and will go into effect Jan. 1.

Mayor Samuel Hastings of Highland Park, Ill., said that the rates agreed upon were to be $1 for the first 1,000 feet of gas consumed, then 90 cents up to 10,000 feet, 80 cents for the next 89,000 feet and lower rates for big industrial consumers. This is a reduction of 10 cents per thousand after the first thousand.

Plymouth Company Wishes to Increase Capital

The Plymouth Electric Light Company has petitioned the Massachusetts Gas and Electric Light Commission for the right to increase its capital stock from $270,000 to $400,000. The money they realize from the new stock will be used to pay off the floating debt incurred in plant extensions.

Coast Counties Company has Good Record

The Coast Counties Gas and Electric Company is fast becoming a good money maker as is shown by its statement on October business recently made public by the State Railroad Commission. The net earnings for last month were $4,495.81 as against $3,832.23 for October of last year. For the ten months of this year inclusive of October, the corporation earned $76,078.86 net. This is $6,366.19 better than the 1915 earnings for the same period.

Basis of All Service is Quality

In the last analysis the sale of a manufactured product is not consumated until the goods have been received and willingly paid for by the ultimate consumer, declares the composite paper of the Manufacturers' Section, edited by W. W. Barns, prepared for presentation at the annual meeting of the National Commercial Gas Association. Reasoning from that premise it becomes plain that the distributor of heating and cooking appliances is in theory one with the manufacturer. We repeat—the manufacturer and distributor are working together to serve the consumer.

Consequently if their work is to prove permanently effective, it must be accomplished in perfect harmony and with but a single aim—to profit most by serving the consumer best.

The basis of all service is quality, and merchandising activity to be truly effective must be capable of not only unholding and constantly advancing quality, but also of securing a fair price equivalent.

The frequently observed tendency to appeal to the consumer on the basis of price rather than quality at a fair price would seem to argue a lack of merchandising effort and ability. Individual commercial units in the hardware, furniture and department store organizations are consistently successful in selling appliances on the basis of an out and out quality appeal. The recognition of that fact precludes all possibility of dodging the admission that merchandising as sometimes practiced to-day in the gas industry is far below the required standard of modern merchandising practice.

To lay the blame for this condition upon those who comprise the actual selling end would be manifestly unfair. The real cause lies deeper than that. It is traceable directly to the funda-

mental error of attempting to develop a satisfactory selling organization and adequate merchandising methods through the medium of the kind of effort necessary in selling on the basis of price without due regard to quality.

The first step toward the development of proper merchandising methods should be to decide definitely upon just what constitutes the particular merchandising problem to be solved. The consumer buys an appliance as a means to an end. Appreciation will be entirely regulated by the efficiency with which the appliance performs its function. This is the dominant thought in the mind of the prospective purchaser, "Will it do the work?" When that has been decided upon to the satisfaction of the prospective purchaser, the items of quality, workmanship, economy of operation and convenience, together with the reliability and reputation of the manufacturer and of the distributing agency, must be emphasized in order to balance the price asked. Ranges, water heaters, lighting fixtures, etc., are familiar objects to all. Nevertheless, only those possessing an intimate knowledge of them can make a correct appraisal unaided by the educational assistance of proper merchandising methods.

City Cannot Dictate Rates is Court's Decision

No cause for action was the decision handed down by Municipal Judge Albion B. Titus in Kalamazoo's suit against the Michigan Light Company, because the latter failed to abide by an ordinance which had been passed by the city council recently.

The ordinance provided that the gas company should furnish the commodity at 75 cents per 1,000 cu. ft. In a lengthy ruling, Judge Titus contended that the city had no right to say at what price anything shall be sold.

Detroit's Gas Supply Ranks Fourth in World

That Detroit's gas supply is fourth largest in the world, being exceeded only by that of New York, Chicago and Philadelphia, was a statement made Friday evening by John W. Batten, engineer for the Detroit City Gas Company, in an illustrated address he delivered before the Detroit Engineering Society.

Mr. Batten's address was a discussion of the illuminating and thermal values of the product and of how coal and water gas are made. He also spoke of how much had been done toward the elimination of sulphur from gas by the manufacturers.

State Cuts Valuations Ordered by Commission

The state board of equalization has cut the valuations on three of the corporations in Denver, Colo., to the extent of $5,942,358. This represents a reduction in the state tax commission's figures of $1,875,280 to the Denver Gas & Electric Light Company, and of $4,067,978 to the tramway companies.

The value of the gas company as fixed by the commission initially was $13,167,650. The county board of equalization reduced this to $9,046,990. Subsequently, the county board raised this by $2,235,380 to $11,282,370, which figure has been accepted by the state board.

Interrelations of Gas Companies in Boston Criticised by Commission

At a hearing Dec. 4 before the Gas and Electric Light Commission of Massachusetts, on the Boston Consolidated Gas Company's petition for its approval of a contract for the purchase of gas for the New England Gas & Coke Company, Commissioner Morris Schaff criticized the policy of having another company supply the gas to the Consolidated, arguing that the latter should maintain and operate its own gas producing plants to the full extent of the output used for distribution. The Commissioner believed the customers should be getting this gas at 70 cents per 1,000 cu. ft. or less.

President Richards of the Gas and Coke Company pointed out that materials for the construction of a new plant would now cost 90 per cent more than they would three years ago.

The new contract between the companies call for a price of 34.5 cents, instead of 29.5 cents under the preceding agreement, just expiring.

Chicago Company Offers 65-Cent Gas—Reasons for Rejecting City's Proposal

William G. Woolfolk, manager of Sanderson & Porter, the engineering firm, representing the People's Gas Light & Coke Company, recently made a counter proposal to the city's demands in the form of an offer to "consider" a 65-cent rate coupled with a 25-cent "readiness-to-serve" charge.

Inasmuch as more than half the gas consumers use 2,500 cu. ft. of gas a month, their average rate on this basis would be about 72½ cents. For the first 1,000 feet the price would be 80 cents, and for each succeeding thousand 65 cents.

The company's proposal is 10 cents higher than the rate urged by the city's representatives, E. W. Bemis and attorney Donald R. Richberg. Their report advocated a 25 cent "readiness-to-serve" charge and a 55 cent rate for gas.

In addition to its counter proposal on rates, the company offered to "consider favorably" a revised system of profit sharing, whereby earnings in excess of bond interest and 6 per cent on stock would be divided as follows: 33 1/3 for consumers, 33 1/3 for amortization, and 33 1/3 for stockholders.

With regard to gas standards, the reply takes issue with the city's experts, declaring that the proposed "dual standard," that is, 600 heat units and fifteen candle power, would constitute a "very grave burden."

"It will be well nigh impossible," said Mr. Woolfolk, "for us to live up to an ordinance which specifies both standards without losing practically all the operating expenses we are trying to make.

"An essential part of the company's entire proposal to the city is the building of a new gas plant to furnish a new and cheaper type of gas from which it confidently expects ultimately to supply consumers in Chicago at greatly reduced rates. In order to secure the necessary $12,000,000 or $15,000,000 required for building such a plant, it is imperative that the company's credit and financial standing remain unimpaired. The proposal made to the city on behalf of the company was made with this idea, and any abandonment of it would of necessity cause a withdrawal of our proposal."

Paris to Dole Out Gas on a Ration Basis

Measures for placing gas and electricity in Paris, France, upon a ration basis have been drawn up and will be put into effect after the Cabinet ratifies them.

Economy is necessary, as the importation of coal from England which provides half the needs of Paris has diminished perceptibly since the war began. The city gas company has stock sufficient for only about ten days. It requires 4,500 tons daily and receives 3,000. The electric company is better supplied but has only a few weeks' stock.

It is proposed that every gas consumer's daily consumption for the last few months be estimated and that each be allowed one cubic meter daily plus two-thirds of his usual consumption at the regular price, four cents a meter. Additional gas up to 20 per cent will be allowed at the prohibitive price of 19 cents a meter. If this limit is exceeded gas will be cut off.

Electricity will be similarly regulated. Three kilowatts plus half the usual consumption will be allowed at the ordinary rates and 20 per cent additional at four times the ordinary rate. The current will be cut off if this is exceeded.

R. E. Breed to be President of New Corporation

R. E. Breed of New York, president of the American Gas and Electric Company, will be president of the new Central Power Company that is to be the consolidation of the Canton Electric Company and a number of smaller electric light and power companies in Ohio.

It is thought that the consolidated companies will incorporate at $50,000,000. The capitalization is made high, because it is the plan of men at the head of the organization to take in other companies later.

The Canton (Ohio) company and others serve the following towns: Logan, Shawnee, Mt. Vernon, Newark, Lancaster, Crooksville, Fremont, Tiffin, Fostoria, Shadyside, Neffs, Glencoe, Bethesda, Barnesville, St. Clairesville, Dillonvale, Tiltonville, New Yorkville and Wardrow.

Columbus (Ohio) Company Wishes to Sell

The Citizens' Gas and Electric Company of Lorain has asked permission of the Utilities Commission to sell its property to the Lorain County Electric Company. The purchase price agreed on is $250,000.

Progressive Ideas of Display

To combine the mere commercial display of lighting fixtures with the beauty of real home surroundings, is the basis for the latest improvements at the Brooklyn Union Gas Company's show rooms on Remsen street, Brooklyn, N. Y.

The offices which were formerly in the rear of the display room under the mezzanine floor, have been moved to the second floor. The now available space is being refinished to produce the most harmonizing and homelike effects. The plan is to have large comfortable chairs and heavy furniture with Old English finish and a fireplace to give the final touch.

The fireplace is of circular type found in such a large percentage of the old Brooklyn homes and will show how neatly and easily an asbestos grate can be installed.

This addition will give the company an opportunity to display at least 40 large hanging globes of the latest types besides the table room for a larger assortment of appliances.

Many new and original fixture designs and shade and fixture combinations have had their source at the Brooklyn Union Gas Company. The cretonne shade made in three colors, inflammable and guaranteed not to warp, manufactured by the Welsbach Company, has been found to be one of the sales leaders.

The gas range and heater business this season has been phenomenal, and many of the best selling appliances have had to be taken off the display floor because of the inability to obtain them from the manufacturers.

Massachusetts City Employs Municipal Rate Expert

The city council of Leominster, Mass., which is investigating the rates and service of the gas and electric utilities, has retained Mr. Alton D. Adams, consulting engineer, of Boston, to aid in the work. Mr. Adams has specialized along lines of rates and service to municipalities for many years.

In investigating the service of the gas company, said Mayor Sawtelle, the principle and working of the Boston sliding scale will be looked into, and the problem of a proper standard of calorific value will also be taken into consideration. The city government proposes to go before the Gas and Electric Light Commission for a hearing, with Mr. Adams representing city interests.

The electric company, its services and rates will also be under examination.

Several New Members Join Manufacturers' Section of National Commercial Gas Association

The following companies have become members of the Manufacturers' Section of the National Commercial Gas Association since the Atlantic City Convention:

R. Williamson & Co., C. E. Ummach, Chicago, Ill.
Lovekin Company, W. D. Peck, Philadelphia, Pa.
Nichols Gas Fixture Mfg. Co., H. T. Owens, Brooklyn, N. Y.
Gehnrich Indirect Heat Oven Co., N. Gehnrich, Brooklyn, N. Y.
Strong, Carlisle & Hammond Co., E. F. Davis, Cleveland, Ohio.
Remington Typewriter Company, R. C. Stevens, New York, N. Y.
Pittsburgh Coal Company, J. D. Huddell, Pittsburgh, Pa.

Naturally, the big event in the manufacturers' year is the exhibition of appliances at the yearly convention. Every manufacturer of gas-using appliances, as well as manufacturers of apparatus and equipment of use to gas men, realizes the importance of exhibiting his wares at the annual convention, according to W. W. Barnes, secretary of the section. But, that these new members should ally themselves with the Manufacturers' Section directly after the convention has been held, is an indication of the fact that they see in the Manufacturers' Section all-the-year-round benefits to be obtained from membership.

Pacific Coast Gas Association Appoints Committees for New Year

President C. B. Babcock of the Pacific Coast Gas Association has appointed the following members for 1917 for the various committees:

WRINKLE DEPARTMENT, D. J. Young, Editor, San Diego Consolidated Gas & Electric Company, San Diego, Cal.

EXPERIENCE DEPARTMENT, John Clements, Editor, Pacific Gas and Electric Company, Oakland, Cal.

PUBLICITY DEPARTMENT, F. S. Myrtle, Editor, Pacific Gas and Electric Company, San Francisco, Cal.; W. M. Henderson, Asst. Editor, Pacific Gas and Electric Company, San Francisco, Cal.

LIBRARY, E. C. Jones, Librarian, Pacific Gas and Electric Company, San Francisco, Cal.; Joseph P. Baloun, Asst. Librarian, Pacific Gas and Electric Company, San Francisco, Cal.

GAS ENGINEERING DEGREE COMMITTEE, Chairman, John A. Britton, Pacific Gas and Electric Company, San Francisco, Cal.; L. P. Lowe, 626 Pacific Building, San Francisco, Cal.; F. A. Cressey, Jr., Modesto Gas Company, Modesto, Cal.; E. C. Jones, Pacific Gas & Electric Company, San Francisco, Cal.; C. L. Cory, Nevada Bank Building, San Francisco, Cal.

GAS EXHIBITS COMMITTEE, Chairman, B. S. Pedersen, Geo. M. Clarke Stove Company, San Francisco, Cal.; H. W. Jackson, James Graham Manufacturing Company, San Francisco, Cal.; R. L. Cardiff, Santa Cruz Gas & Electric Company, Santa Cruz, Cal.; L. C. Braun, Eclipse Gas Stove Company, San Francisco, Cal.; R. J. Thompson, Welsbach Company, San Francisco, Cal.; Paul E. Haugh, Trenkamp Stove & Manufacturing Company, Los Angeles, Cal.; T. Leary, Rep. H. Mueller Manufacturing Company, San Francisco, Cal.

PUBLIC POLICY COMMITTEE, Chairman, L. H. Newbert, Pacific Gas and Electric Company, San Francisco, Cal.; Champ S. Vance, Los Angeles Gas & Electric Corporation, Los Angeles, Cal.; F. R. Bain, Southern Counties Gas Company, Los Angeles, Cal.; M. L. Neely, Pacific Gas and Electric Company, Fresno, Cal.; H. M. Papst, Portland Gas Company, Portland, Ore.

LEGISLATION AND TAXATION COMMITTEE, Chairman, Paul Overton, Los Angeles Gas and Electric Corporation, Los Angeles, Cal.; C. P. Cutten, Pacific Gas and Electric Company, San Francisco, Cal.; S. Waldo Coleman, Coast Counties Gas & Electric Company, San Francisco, Cal.; W. B. Cline, Los Angeles Gas & Electric Corporation, Los Angeles, Cal.; H. H. Jones, San Diego Cons. Gas & Electric Company, San Diego, Cal.; S. C. Bratton, Portland Gas & Coke Company, Portland, Ore.; F. R. Bain, Southern Counties Gas Company, Los Angeles, Cal.

COMMITTEE ON PIPING OF BUILDINGS FOR GAS, Chairman, Geo. P. Egleston, Coast Counties Gas and Electric Company, San Francisco, Cal.; E. L. Hall, Portland Gas & Coke Company, Portland, Ore.; M. L. Neely, Pacific Gas and Electric Company, Fresno, Cal.; W. J. Armstrong, Pacific Gas & Electric Company, Oakland, Cal.; S. C. Bratton, Portland Gas & Coke Company, Portland, Ore.; L. F. Galbraith, Pacific Gas and Electric Company, San Francisco, Cal.; T. J. Protheroe, Southern California Gas Company, Los Angeles, Cal.; E. H. Corbett, Pacific Gas and Electric Company, San Francisco, Cal.

COMMITTEE ON PAPERS, Chairman, Henry Bostwick, Pacific Gas & Electric Company, San Francisco, Cal.; F. S. Wade, Southern Counties Gas Company, Los Angeles, Cal; S. C. Bratton, Portland Gas & Coke Company, Portland, Ore; G. P. Egleston, Coast Counties Gas and Electric Company, San Francisco, Cal.; J. M. Berkley, Southern California Edison Company, Los Angeles, Cal.

ENTERTAINMENT AND RECEPTION COMMITTEE, Chairman, Van E. Britton, Pacific Gas & Electric Company, San Francisco, Cal.; Wm. R. Scott, Coast Counties Gas & Electric Company, Santa Cruz, Cal.; Maurice S. Barnett, W. F. Boardman Company, San Francisco, Cal.; A. B. Day, Los Angeles Gas & Electric Corporation, Los Angeles, Cal.; W. P. Hutchinson, Sprague Meter Company, Bridgeport, Conn.

ADVISORY BOARD, Chairman, A. B. Macbeth, Southern California Gas Company, Los Angeles, Cal.; E. A. Gimper, Citrus Belt Gas Company, Corona, Cal.; Prof. R. S. Tour, University of California, Berkeley, Cal.; W. G. Vincent. Jr., Pacific Gas and Electric Company, San Francisco, Cal.; N. L. Morse, Southern California Gas Company, Los Angeles, Cal.

MEMBERSHIP COMMITTEE, Chairman, S. C. Bratton, Portland Gas and Coke Company, Portland, Ore.; R. L. Clarke, San Diego Consolidated Gas & Electric Company, San Diego, Cal.; A. B. Day, Los Angeles Gas & Electric Corporation, Los Angeles, Cal.;

Wm. Dorr, Los Angeles Gas & Electric Corporation, Los Angeles, Cal.; T. B. Parks, Los Angeles Gas & Electric Corporation, Los Angeles, Cal.; F. S. Wade, Southern Counties Gas Company, Los Angeles, Cal.; F. H. Bivens, Southern Counties Gas Company, Monrovia, Cal.; W. G. Rich, Southern Counties Gas Company, Whittier, Cal.; Chas. H. Dickey, Jr., Southern Counties Gas Company, San Pedro, Cal.; N. R. McKee, Southern Counties Gas Company, Santa Monica, Cal.; J. A. Somers, Southern Counties Gas Company, Long Beach, Cal.; F. A. Cressey, Jr., Modesto Gas Company, Modesto, Cal.; M. L. Neely, Pacific Gas and Electric Company, Fresno, Cal.; Frank Cavanagh, 732 Title Insurance Building, Los Angeles, Cal.; A. J. Lloyd, Citrus Belt Gas Company, Redlands, Cal.; H. W. Burkhart, Madera Gas Company, Madera, Cal.; H. R. Basford, Ruud Heater Company, San Francisco, Cal.; L. W. LeBaron, Alta District Gas Company, Dinuba, Cal.; L. F. Chandler, Santa Maria Gas & Power Company, Santa Maria, Cal.; T. J. Protheroe, Southern California Gas Company, Los Angeles, Cal.; R. H. Sterling, Santa Barbara Gas and Electric Company, Santa Barbara, Cal.; G. W. Anderson, Oakdale Gas Company, Oakdale, Cal.; R. P. Valentine, Sacramento Gas Company, Lodi, Cal.; Geo. B. Baldwin, Pacific Gas and Electric Company, Sacramento, Cal.; R. L. Cardiff, Santa Cruz Gas and Electric Company, Santa Cruz, Cal.; J. P. Davidson, 312 West Ninth Street, Los Angeles, Cal.; L. W. Redd, Contra Costa Gas Company, Martinez, Cal.; N. L. Morse, Southern California Gas Company, Los Angeles, Cal.; G. D. Mantle, Pacific Gas and Electric Company, San Francisco, Cal.; Leon B. Jones, Pacific Gas and Electric Company, San Francisco, Cal.; Ross Munro, Eclipse Gas Stove Company, San Francisco, Cal.; Sherwood Grover, San Joaquin Light & Power Corporation, San Luis Obispo, Cal.; Robt. H. Hargreaves, Pacific Gas and Electric Company, San Jose, Cal.; E. A. Gimper, Citrus Belt Gas Company, Corona, Cal.; Otto S. Roen, Ontario-Upland Gas Company, Ontario, Cal.; Z. T. Bell, San Bernardino Gas Company, San Bernardino, Cal.; W. A. White, Central California Gas Company, Visalia, Cal.; W. M. Henderson, Pacific Gas and Electric Company, San Francisco, Cal.; Frank C. Packer, Welsbach Company, San Francisco, Cal.; Geo. B. Furniss, Pacific Gas and Electric Company, Oakland, Cal.; John A. Britton, Jr., Pacific Gas and Electric Company, Oakland, Cal.

Children's Home Wins Gas Range

The Peoples Gas Light Company of Manchester, N. H., have awarded a Detroit Jewell cabinet gas range to the Manchester Childrens' Home, Webster Street. This range was used during the week previous by the Union and Leaders Cooking School. It was to be given to the institution making up the largest income budget. The Manchester Childrens' Home reached the $600 mark thereby winning the range.

George M. Rossman Dead

Col. George M. Rossman, treasurer of the Laconia Gas and Electric Light Company, treasurer and manager of the Keene Gas and Electric Company and treasurer of the Greenfield Gas Light and the Ashuelot Gas and Electric companies, died at nis home in Keene, N. H., December 10. He was a 32d degree Mason and a Shriner, a member of the Elks, New England Association of Gas Engineers, New England Guild of Gas Managers, National Electric Light Association, American Gas Institute, New Hampshire Public Utilities Association and a director of the Keene Development Company.

New Corporations

YUMA, ARIZ.—Articles of incorporation have been filed by the Yuma Light, Gas & Water Company. The incorporators are: R. M. Moore, D. F. Hill and Frank V. Pfaffinger, all of Los Angeles, Cal. Capital is $200,000.

INLAND OIL AND GAS COMPANY of Kansas City; capital, $25,000, one-half paid. Incorporators: J. B. Markey, J. B. Markey, Jr., and W. F. Farrell. Organized to engage in prospecting and drilling for oil and gas.

KANSAS CITY OIL AND GAS COMPANY of Kansas City; capital, $100,000, all paid. Incorporators: E. S. Rhoads, Vernon Ross and C. L. Gray. To prospect for oil and gas and deal generally in oil and gas bearing lands.

INTER LAKE OIL & GAS COMPANY, Tulsa. Incorporators: D. D. Quackenbush, E. T. Nienast, both of Wirt, W. H. Smith, Rush Springs. Capital stock, $75,000.

THE LIBERAL OIL & GAS COMPANY, Claremore. Incorporators: A. M. White, Claremore; G. W. Sawyer, J. C. Mahoney, both of Liberal, Kan. Capital stock, $125,000.

Societies and Associations

THE PITTSFIELD COAL GAS COMPANY EMPLOYEES' ASSOCIATION was both instructed and entertained Dec. 7 by Jesse R. Stetser and H. B. Palmer of the Welsbach company of Gloucester, N. J. Both direct and semi-direct gas lighting fixtures were included in the display, and advantages pointed out.

THE PROGRESSIVE CLUB OF THE BROOKLYN UNION GAS COMPANY held its tenth annual dinner at the Elks Club Dec. 7. Senator-elect William M. Calder, Borough President Lewis H. Pounds and Supreme Court Justice Frederick E. Crane were among the speakers

THE PORTLAND GAS MEETERS held their annual meeting in the rooms of Portland (Me.) Gas Light Company building on Temple Street

THE OLD COLONY GAS COMPANY held their first annual banquet and dinner for the department heads at Pantooset Farm Inn, Hanover, Mass., on Nov. 29.

THE DAYTON SECTION GAS MEETERS held their regular meetings in the main offices of the Dayton Gas Company, Dayton, Ohio, on the evenings of October 27 and November 27, 1916. Approximately one hundred members were present on each occasion, and several interesting and instructive papers were presented and an enjoyable entertainment was appreciated by all.

THE EXECUTIVE COMMITTEE of the Empire State Gas & Electric Association recently held a meeting at Hotel Seneca, Rochester, N. Y. In view of the recent order of the commission in the matter of gas standards it was voted to appoint a committee on calorimetry, to consist of Messrs. Herman Russell, J. B. Klumpp, H. C. Abell, G. T. Macbeth and C. H. Graf, to advise with the gas companies in reference to the requirements of the commission and how best to meet them.

Personal Notes

HOMER HYMAN of Orrville, Ohio, has accepted a position as business manager of the Alliance Gas and Power Company at Alliance, Ohio.

MISS LUVENIA ELLIOT has been appointed as head of a new department organized at the Old Colony Gas Company, Braintree, Mass. This is to be known as the "service and information department." It will be their duty to give information regarding the Old Colony serviee, to any one seeking such information.

Construction Notes

Mineral City, Ohio, Gas Company Extending Main

The Mineral City Ohio Gas Company, supplying natural gas, is extending their line to Factory No. 1 of the Federal Clay Product Company, about a mile east of the city. It will pass a suburb called Fairview, and give its inhabitants an opportunity for light and fuel. One well supplies the gas for Mineral City and the surrounding community. This well is at a depth of 5,200 ft.

Three miles from Mineral City four wells have been drilled to a depth of about 4,800 ft., all of which are producers.

The territory in and around Mineral City has been held under lease for several years by a combination of Italians near Pittsburgh, who drilled the present well. The leases are now expiring.

Colorado Springs Plant to be Improved

An authorization has been made for an increase of from 25 to 30 per cent in gas making facilities at the plant of the Colorado Springs Light, Heat and Power Company. A contract has been signed with the Improved Equipment Company of New York for three new retorts and a 65-ft. smoke stack, together with other improvements which will bring the entire installation up to date. The company has spent about $20,000 during the past year on the plant according to J. F. Dostal, general manager of the company.

Work on North Adams Lights Progressing

The boulevard lights which have been installed by private enterprise on Main Street have led to further installations throughout North Adams, Mass. The work on placing the iron poles and removing the wooden ones is now progressing nicely. The work is being done by the North Adams Gas Company and the city will have a lighting system of which it may be proud in a very short time.

Contracts for Six Holders Awarded

The Stacey Manufacturing Company of Cincinnati recently secured contracts for four 100,000 cu. ft. capacity double lift holders in steel tanks, at San Luis Obispos, Cal.; Douglas, Arizona; Pontiac, Ill., and Malone, N. Y.; also two smaller holders for St. Paul, Minn.; all to be installed next year.

Natick, Mass., Wants System Extended

The Natick Gas Company, Natick, Mass., will be given an opportunity to extend their mains on West Central and adjoining streets, thereby accommodating about fifty consumers. This can be accomplished at a low expense, as their main line passes through West Natick along the railroad tracks from Framingham.

Extensions at Andover, Mass.

The Board of selectmen have recently granted permission to the Lawrence Gas Company to excavate on Bruce Street, Furber Avenue, Highland Terrace, Middlesex, Annis, Davis and Dudley Streets, and Massachusetts Avenue. The work will be started immediately.

Gas Steam Boiler Installed at Braintree, Mass.

A 2 h.p. high pressure gas steam boiler was recently installed at the Smith Chemical Supply Company on Adams Street, Braintree. This boiler will take care of the large Calander machine that is automatically controlled.

Recent Patent Issues

Prepared by Royal E. Burnham, 833 Bond Building, Washington, D.C.

1,205,587. METER-GLAND. David R. Yarnall, Philadelphia, Pa., assignor to Yarnall-Waring Co., same place.

1,205,698. BY-PRODUCT COKE-OVEN. George H. Benjamin, New York, N. Y.

1,206,022. MACHINE FOR MANUFACTURING MANTLES employed in incandescent lighting. Jean L. Muller, Sannois, France, assignor to himself and Joseph Bonnet, Paris, France.

1,206,192. GAS-INDICATOR. Herman Bacharach, Pittsburgh, Pa.

1,206,282. GAS-GOVERNOR. William M. Wood, Philadelphia, Pa., assignor to The United Gas Improvement Co., same place.

1,206,307. AIR-VALVE FOR WATER-GAS APPARATUS. James A. P. Crisfield, Philadelphia, Pa., assignor to The United Gas Improvement Co., same place.

1,206,365. GAS-METER. Frank H. Payne, Erie, Pa.

1,206,490. APPARATUS FOR INDICATING THE VOLUMETRIC FLOW OF A GAS. Ernest E. Werner, St. Louis, Mo.

1,206,588. APPARATUS FOR QUENCHING, SCREENING, AND LOADING COKE. Charles Piez, Chicago, Ill., assignor to Link-Belt Co., same place.

Financial Notes

THE UNITED FUEL GAS COMPANY, a subsidiary of the Columbia Gas & Electric Company, in its advance statement for November, 1916, shows gross of $551,534, compared with gross of $307,975 for November, 1915, a gain of $234,559, or 79 per cent.

THE CONSOLIDATED GAS, ELECTRIC LIGHT & POWER COMPANY OF NEW YORK has declared the regular quarterly dividend of 1¾ per cent on its common stock.

THE STANDARD GAS & ELECTRIC COMPANY has declared a dividend of 1½ per cent on preferred stock for the quarter ended Nov. 30, payable Dec. 15, to stockholders of record Nov. 30. This is an increase of one-half of 1 per cent over recent dividend payments.

THE WESTERN STATES GAS & ELECTRIC COMPANY, for the years ended October 31, 1914, 1915 and 1916, are as follows:

	1914	1915	1916
Gross	$1,104,622	$1,175,780	$1,226,642
Net	505,209	571,752	586,933

The 1916 net is equivalent to more than twice all interest charges on bonds and notes of the company.

THE DUQUESNE LIGHT COMPANY, a subsidiary of the Philadelphia Company, reports gross for October $540,133, increase $99,600; net $223,296, increase $9,245, and surplus $157,734, increase $13,519.

THE INTERMOUNTAIN RAILWAY, LIGHT & POWER COMPANY reports for year ended Oct. 31 gross $225,759, against $158,027; net $92,127, against $58,311, and surplus $61,054, against $32,348.

NEW ORLEANS RAILWAY, LIGHT & POWER COMPANY reports for nine months ended with September gross $5,327,217, increase $179,855; net $2,045,299, increase $85,717, and surplus $452,987, decrease $63,950.

THE WASHINGTON-IDAHO WATER, LIGHT & POWER COMPANY—Liggett, Hichborn & Company, Inc., have purchased the electric light, power and water department from the Lewiston-Clarkston Improvement Company—the principal communities served being Lewiston, Ida., and Clarkston, Wash.—and have formed a new An issue of bonds is expected to be announced soon.
company, the Washington-Idaho Water, Light & Power Company.

THE COHOES POWER & LIGHT CORPORATION has been incorporated in Albany, to operate in Albany and Saratoga counties.

THE OHIO CITIES GAS COMPANY has purchased from Gunsberg & Foreman oil properties in Oklahoma and Kansas, and also those of the Southwestern Oil Company.

THE SPRINGFIELD GAS COMPANY reports net earnings of $27,503 for the six months ended Sept. 30.

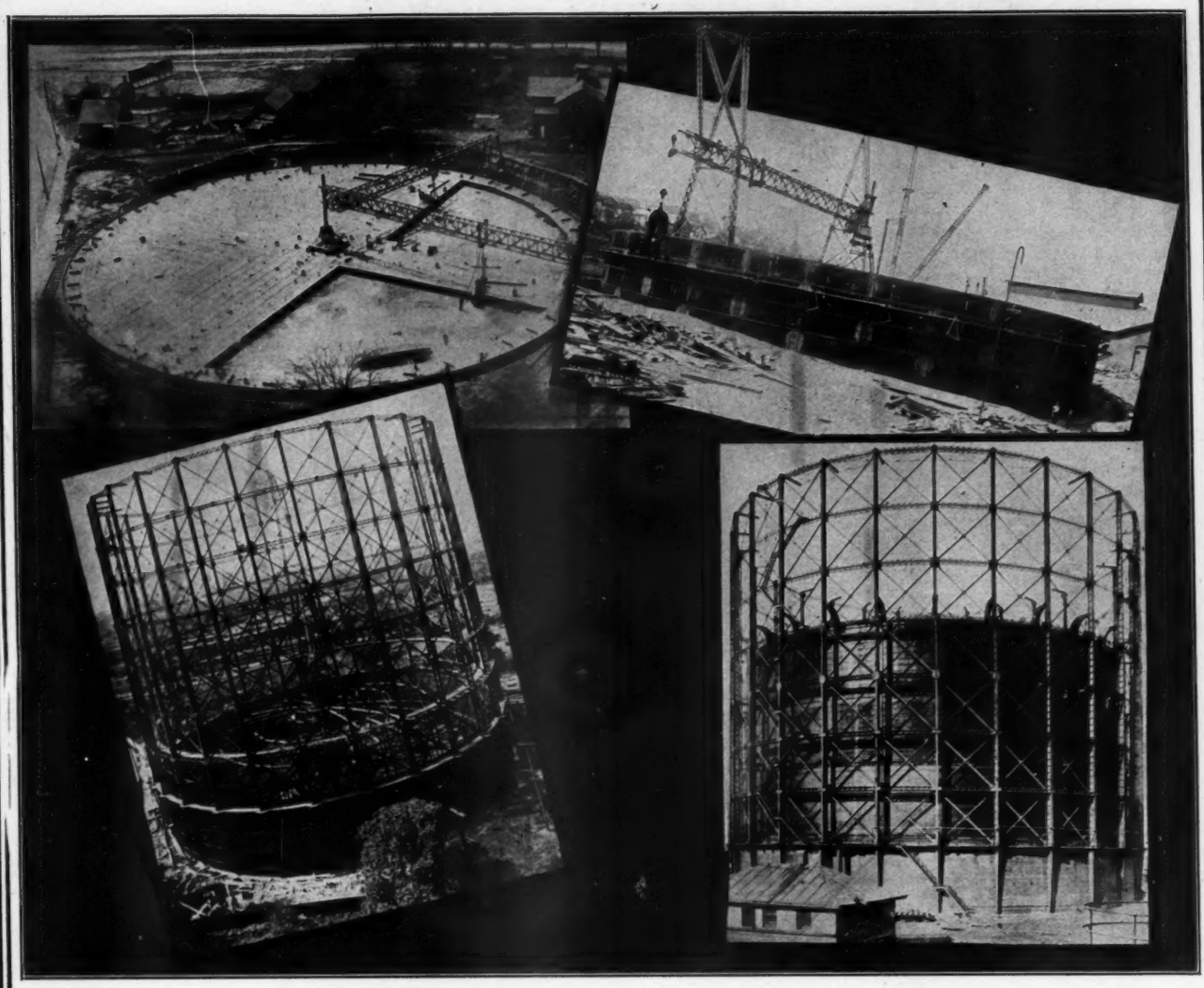
THE BLACKSTONE VALLEY GAS & ELECTRIC COMPANY has declared the regular semi-annual dividend of $3 a share on its preferred stock, and the regular quarterly dividend of $2 a share on its common stock, both payable December 1.

THE ROCHESTER RAILWAY & LIGHT COMPANY has declared a quarterly dividend of 1¼ per cent on its preferred stock.

THE LACLEDE GAS COMPANY of St. Louis has declared a semi-annual dividend of 2½ per cent on its preferred stock, and a quarterly dividend of 1¾ on common.

THE MASSILLON ELECTRIC & GAS COMPANY has completed arrangements to refund its present practically closed first mortgage bond issue, in the authorized principal amount of $500,000 maturing in 1948, with a new one of $2,000,000 authorized amount, to mature in 1956. The new issue will be secured by a first mortgage on all the property of the company. The Public Utilities Commission has authorized the issuance immediately of $540,000 (more or less) of the bonds, sufficient to effect the retirement of the present first mortgage issue also permitting the company to sell $125,000 of 6 per cent cumulative preferred stock, which will make the outstanding amount of the preferred $250,000. The present earnings of the company are equivalent to four times the interest requirements of the new bonds, leaving a balance equal to over five times the preferred dividend. The bonds are being handled by Henry & West, of Philadelphia, while Roland T. Meacham, of Cleveland, is offering the stock.

(Continued on Page 16 Advertising Section



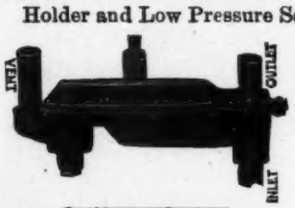
RITER-CONLEY COMPANY

STEEL CONSTRUCTION

PITTSBURGH

REYNOLDS GOVERNORS

We make anything desired in the GAS GOVERNOR or REGULATOR to meet any and all classes of reductions. Stations for DISTRICT SERVICE, INDIVIDUAL HIGH PRESSURE GOVERNORS for reducing high pressure gas to inches of water. Holder and Low Pressure Service Governors. A steady, uniform pressure can be obtained by using REYNOLDS GOVERNORS, "THE WORLD'S STANDARD." We make a specialty of the Governor business, devoting our entire time to the manufacture of same. All Governors are GUARANTEED.



Combination Governor
Governor and Mercury Seal

REYNOLD'S GAS REGULATOR COMPANY
ANDERSON, INDIANA. U. S. A.

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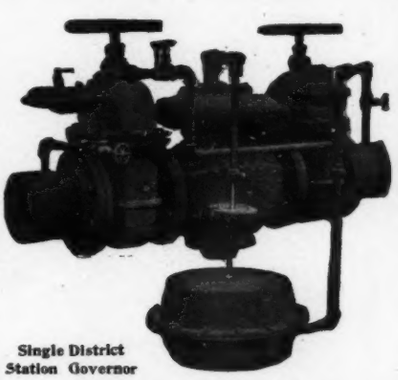

Single District
Station Governor

Financial Notes.

THE CONSOLIDATED GAS COMPANY OF BALTIMORE reports gross earnings of $716,850, a gain of 12 per cent over the corresponding period of the previous year.

THE KNOXVILLE RAILWAY & LIGHT COMPANY has called for payment at 100½ all of its $325,000 two year 6 per cent collateral trust notes due July 1, 1917, through the New York Trust Company on January 3.

THE BRAZILIAN TRACTION, LIGHT & POWER COMPANY reported for October gross earnings aggregating 7.037,000 milreis, increase 244,000 milreis over October, 1915; net 3,821,000 milreis, decrease of 86,000 milreis. For ten months ended October 31, gross 68,286,000 milreis, increase 4,035,890 milreis over ten months of 1915; net 38,194,000 milreis, increase 391,000 milreis.

BYLLESBY & COMPANY reports combined gross earnings of properties under management of this company for October were $1,439,920, increase $140,209; net $719,444, increase $53,471. Twelve months gross $16,789,573, increase $1,452,764; net $8,244,574, increase $816,543.

THE STANDARD GAS & ELECTRIC COMPANY, operating lighting and water properties in sixteen southern and western states, recently declared a quarterly dividend of 1½ per cent, or half of 1 per cent over its previous dividend on the preferred stock.

THE EQUITABLE ILLUMINATING GAS LIGHT COMPANY OF PHILADELPHIA announces that their first mortgage 5 per cent bonds have been drawn for redemption at 105 and accrued interest to Jan. 1, 1917.

THE COAST COUNTIES GAS & ELECTRIC COMPANY reports gross earnings for October aggregating $29,068, increase $274; net $11,181, increase $389. Ten months' gross $305,633, increase $25,156; net $143,126, increase $3,163.

THE NORTHERN STATES POWER COMPANY reports increased net earnings amounting to $512,141, year ended Oct. 31.

THE STANDARD GAS & ELECTRIC COMPANY declared a quarterly dividend of 1½ per cent on preferred stock, payable Dec. 15, to stock of record Nov. 30. This is an increase of ½ of 1 per cent over the last quarterly dividend.

THE REPUBLIC RAILWAY & LIGHT COMPANY reports net earnings for October aggregating $149,691, compared with $109,944 in same period in 1915. Net for 10 months ended Oct. 31 $1,373,779, compared with $972,350 in same period in 1915.

THE SOUTHERN CALIFORNIA EDISON COMPANY reports net earnings for October amounting to $215,521, compared with $216,162 in same period of 1915. Surplus, after charges, $86,147, compared with $55,597 in same period in 1915.

THE CONSOLIDATED GAS, ELECTRIC LIGHT & POWER COMPANY OF BALTIMORE reports that temporary 5 per cent convertible notes, due 1921, have been admitted to the New York Stock Exchange.

THE PUBLIC SERVICE CORPORATION OF NEW JERSEY, in its financial statement just issued for October, shows a gross increase in total business over October, 1915, of $466,189.61, a percentage increase of 13.9. The gross increase in total business for the ten months ending October 31 over the corresponding period in 1915 was $4,096,443.45, representing an increase of 13.4 per cent. The statement follows:

Month of October, 1916.	
Gross increase in total business	$466,189.61
Percentage of increase	13.9
Balance available, after payment of operating expenses, fixed charges, sinking fund requirement, etc., for amortization, dividends and surplus	$641,066.97
Increase in surplus available for dividends over corresponding month 1915	$130,234.32
Ten Months Ending October 31, 1916.	
Gross increase in total business	$4,096,443.45
Percentage of increase	13.4
Balance available, after payment of operating expenses, fixed charges, sinking fund requirement, etc., for amortization, dividends and surplus	$4,568,381.43
Increase in surplus available for dividends over corresponding period 1915	$1,018,738.74

THE COLORADO POWER COMPANY reports gross earnings for October amounting to $99,846, increase $19,822; net $55,170, increase $14,321. Twelve months' gross $982,748, increase $124,-657; net $561,101, increase $26,907.

CONNECTICUT POWER COMPANY reports for October gross earnings aggregating $73,676, increase $19,119; net $34,835, increase $6,531. Twelve months' gross $716,049, increase $168,570; net $358,515, increase $95,756.

THE FEDERAL LIGHT & TRACTION COMPANY reports gross earnings for October amounting to $201,809, increase $7,582; net $79,943, increase $14,820. Twelve months' gross $2,496,989, increase $138,726; net $848,709, increase $4,838.

THE PUGET SOUND TRACTION, LIGHT & POWER COMPANY reports gross earnings for October $690,475, increase $80,693; net $277,762, increase $55,555. Twelve months' gross $7,855,965, increase $165,951; net $2,842,301, decrease $72,547.

THE U. S. PUBLIC SERVICE COMPANY reports for October gross earnings of $93,141, increase $11,429; net $38,406, decrease $258. Twelve months' gross $1,055,016, increase $153,695; net $463,981, increase $92,339.

Current Prices of Public Utility Securities

	Bid	Asked
Adirondack Elec. P	25	27
Adirondack Elec. P. pf	84	86
American Gas	120	123
*American Gas & Electric	152	155
*American Gas & Electric pf	50	52
American Light & Traction	380	384
American Light & Traction pf	111½	113½
American Power & Light	79	81
American Power & Light pf	86½	88
American Public Utilities	40	44
American Public Utilities pf	72	75
American Water W. & Elec	12¼	13¼
Amer. W. W. & E. 1st pf	73	76
Amer. W. W. & E. Part'p pf	27	30
Carolina Pow. & Lt	35	38
Carolina Pow. & Lt. pf	98	102
Cities Service	328	333
Cities Service pf	93	95
Colorado Power	31	33
Colorado Power pf	101	105
Commonwealth, Pr. Ry. & Lt	59	61
Commonwealth, Pr. Ry. & Lt. pf	83	85
Electric Bond & Share pf	100	102
Empire District El. pf	90	95
Federal Light & Traction	17	19
Federal Light & Traction pf	55	58
Gas & Electric Securities	300	325
Gas & Electric Securities pf	95	100
Northern States Power	107	109
Northern States Power pf	100	101½
North. Ont. Lt. & P	14	17
North. Ont. Lt. & P. pf	59	64
Ozark Power & Water	44	48
Pacific Gas & Electric	65	66
Pacific Gas & Electric pf	91	92½
Republic Ry. & Light Co	53½	54½
Republic Ry. & Light Co. pf	76	78
*Standard Gas & Electric	16	17
*Standard Gas & Electric pf	42½	43½
So. Cal. Edison	93	95
So. Cal Edison pf	107	110
Tennessee Ry., Light & Power	10	11
Tennessee Ry., Light & Power pf	47	49
United Light & Railways	49	51
United Light & Railways 1st pf	78	80
Western Power	19	21
Western Power pf	69	71

*Par value $50